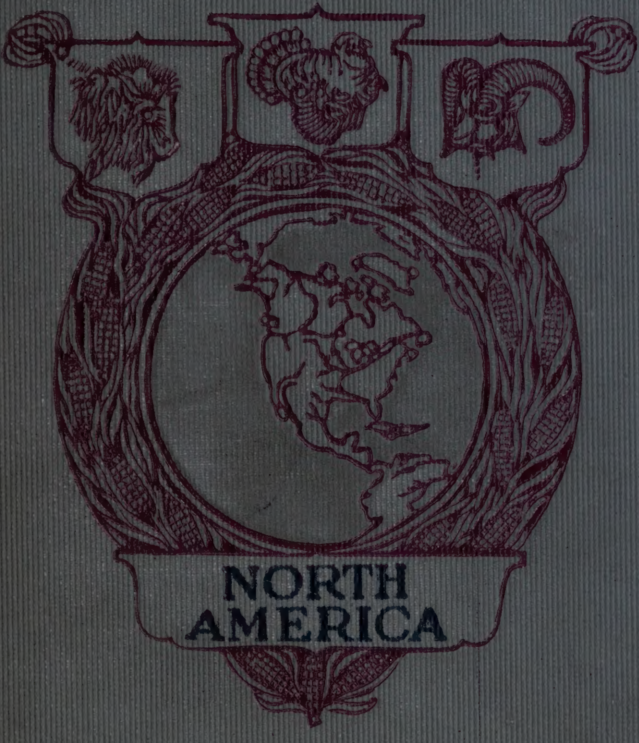
CARPENTER'S NEW GEOGRAPHICAL READER



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Airplane view in Washington, D. C. Potomac River, Tidal Basin, Washington Monument, Treasury, White House, etc. (pages 24, 26).

CARPENTER'S NEW GEOGRAPHICAL READER

NORTH AMERICA

BY

FRANK G. CARPENTER, LITT.D., F.R.G.S.

AUTHOR OF

"AROUND THE WORLD WITH THE CHILDREN" AND

"READERS ON COMMERCE AND INDUSTRY"

UNIV. OF CALIFORNIA
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FRANK G. CARPENTER

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"Reading Carpenter is Seeing the World"

Introduction to Geography

AROUND THE WORLD WITH THE CHILDREN

Geographical Readers

NORTH AMERICA
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EUROPE
ASIA
AFRICA
AUSTRALIA AND ISLANDS OF THE SEA

Readers on Commerce and Industry

HOW THE WORLD IS FED
HOW THE WORLD IS CLOTHED
HOW THE WORLD IS HOUSED

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PREFACE

For more than twenty years Carpenter's Geographical Readers have held a large place in the teaching of geography. They have supplied the flesh and blood necessary to clothe the dry bones of the geographic textbooks, and have made the countries and peoples living wholes in the minds of the pupils. In these books, written in the form of personally conducted tours over each continent, the children themselves have traveled with the author by land and sea from country to country and from city to city all over the globe, visiting the peoples on their farms and in their factories to learn how they live and work, and how each is associated with us and the other nations in the industries and trade of the world.

Carpenter's New Geographical Readers, of which this volume on North America is one, are revisions of the original books, based upon tens of thousands of miles of new travels and research in the countries described. The books have been rewritten in the light of these travels and in accordance with the economic, industrial, and commercial demands of the present. They have all the features that have made the Carpenter readers so much loved by the children, and they have many other features which will increase their value as textbooks to be used in connection with any supplementary work in geography.

The value of the changes will be seen by an examination of the present volume. The new "North America" is equipped with a series of problem and research questions and proposed journeys which, worked out in connection with the distance and other tables at the back of the book, will, it is believed, give each pupil a practical grasp of the chief cities and industrial localities of our continent, as well as a working knowledge of its resources and trade.

With the proper use of the text and the tables at the back, any child should be able to tell how he can travel from his home by the shortest route to the chief ports of the other continents, and give an approximate idea of the distance he will travel and how long he will be on the way. He should be able to trace goods to and from the great ports of North America, and learn the trade routes of the United States and other parts of the world.

Throughout the new "North America" the author has kept in mind the importance of the United States as a part of our continent. Indeed, the book might rightly be entitled a United States Reader, for it deals chiefly with the United States and with the other countries of North America as related to us. Moreover, it deals with the United States in the international place it has held since the World War, and the place it holds industrially and commercially in the work of the world.

In the new "North America" the world relations of our country are kept uppermost in the minds of the children. The pupil studies the industries and resources of his own country as related to those of other parts of the world, and the part that each has in the new world of today. He learns also the important place that the United States now holds in this great world, and becomes proud of the fact that it is his country and that he is a part of it. The book bristles with Americanism. It is an American book written from the American standpoint for the American child, and it cannot but foster and stimulate patriotic Americanism in the minds of the pupils.

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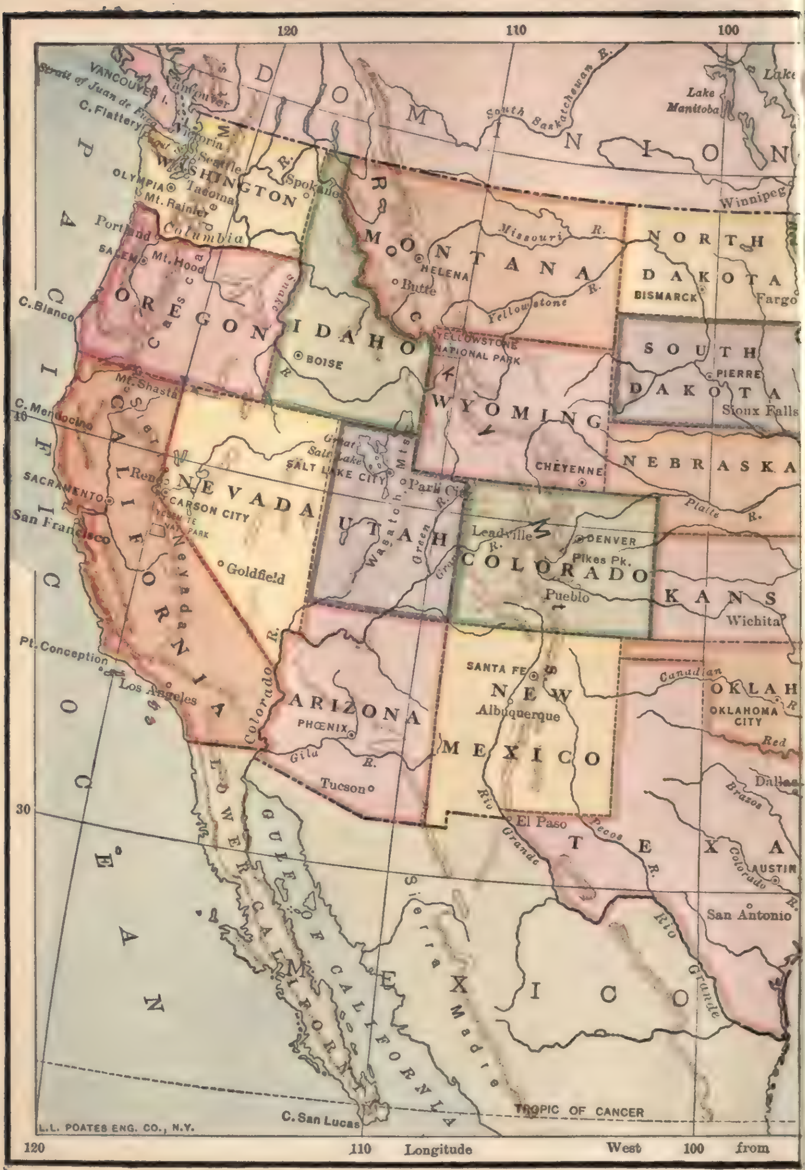
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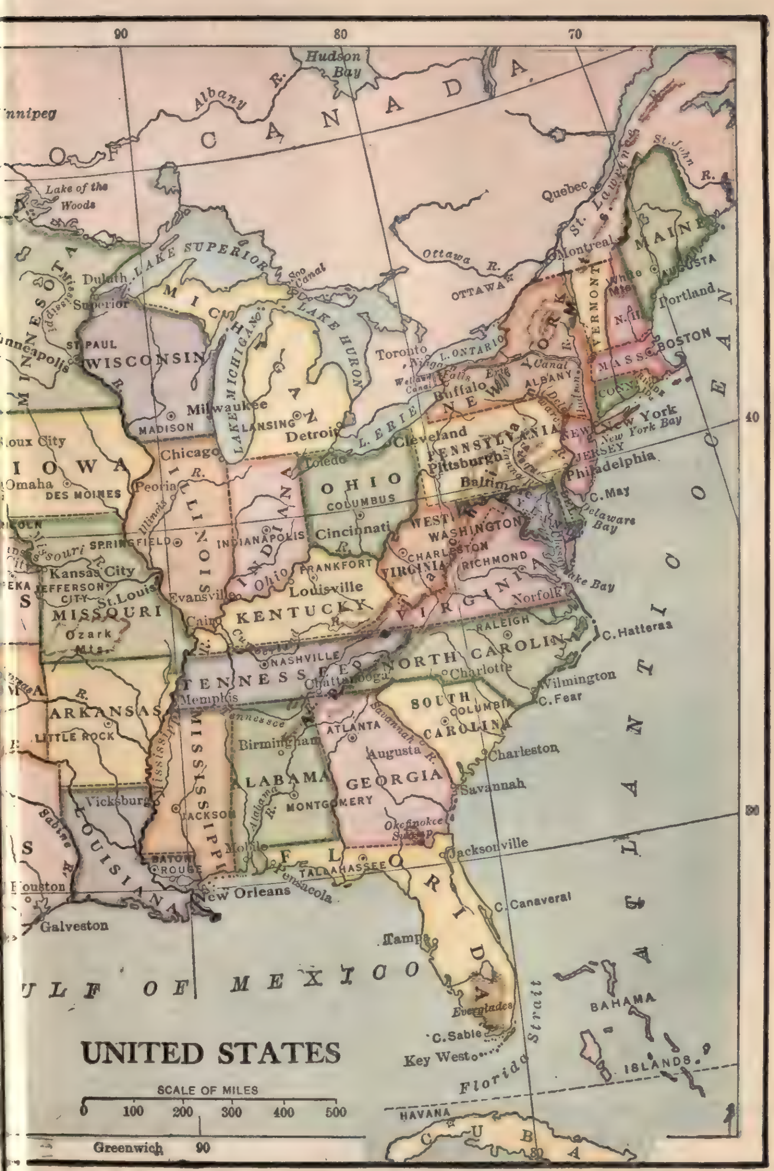


UNITED STATES

The statue of Liberty, in New York harbor, welcomes the thousands of newcomers who enter that port every year.

NORTH AMERICA

I. GENERAL VIEW OF NORTH AMERICA

THIS book is the story of our travels through the North American continent. Most of our time will be spent in that part of it known as the United States, which we are proud to call our own country.

We shall make several journeys by airplane in our travels through North America.

What would you think of a farmer who did not know his own farm or what he had on it, or the manager of a factory who knew nothing of the machines or other things he was making, or of a merchant who had no idea of the goods he had to sell or the customers who might come to buy? I venture you would say that each of these men was foolish, and that he ought to wake up and bestir himself to learn all about his property and how it should be managed for his own good and that of his neighbors.

Now, the boys and girls of this country, together with their parents, are the owners of the most valuable farm, the greatest factory, and the biggest store upon earth. The farm produces so much food in wheat, oats, corn, and other crops, and in sheep, cattle, and hogs, that it is able to supply not only all that we need, but to send food abroad to millions of people of other lands. It produces so much cotton that it furnishes more than half the clothing of the whole human race, and it has also a great part of all of the coal, iron, copper, gold, and silver on earth. The factory makes goods of many kinds, which sell for billions of dollars a year and are shipped all over the world. The store is the biggest mercantile business known to man, a business which supplies all our own wants, and trades with every people upon the globe. This farm, this factory, and this store belong to the United States, and we, as their owners, should know all about them and the part they play in our lives and in the life and work of the world. That is what we shall try to find out in this book.

Before we start let us take a general view of the North American continent. We want to know just where we live on it and some things about the other countries which are our next-door neighbors. We can do this by looking at North America on the globe; or, better, let us suppose we have taken a magic car, a hundred times swifter than any airplane, and have shot through space up to the moon. We shall suppose we are standing there with telescopes so powerful we can see the whole earth as it turns slowly around under our eyes.

Where is North America, and how does it look when spread out below us? We see first the oceans. They sparkle like silver under the rays of the sun, and the masses of dry land look darker. We observe that North America is on the northern half of the earth. It is on that half of the globe that has the most land, and where the most people live. It is in the richest and busiest part of the earth's surface and so bounded by oceans on the east and the west that ships can easily go back and forth to trade with other parts of the world.

Now let us take a rapid glance around the coastline of the continent. At the northwest is Bering Strait, which separates North America from Asia. It is a thin line of silvery water so narrow that the Eskimos sometimes cross over in their skin boats to Siberia. Starting there our eyes travel southward along the western shores of Alaska, the Dominion of Canada, the United States, Mexico, and Central America to the Isthmus of Panama. Crossing the Isthmus not far from our canal, and turning to the north, we follow the coast of Central America and Mexico, and then move along the United States to New England and on by the rocky shores of Newfoundland and Labrador. A little later our eyes turn to the west and roam along the swampy tundras of the Arctic coast until they reach our starting point at Bering Strait.

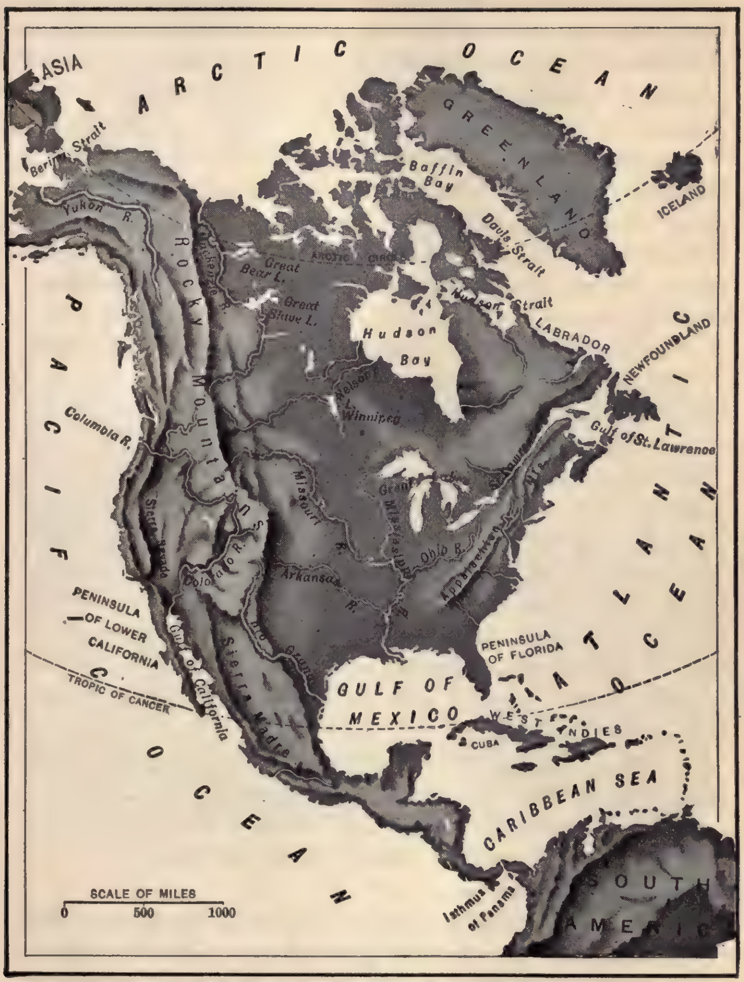
This coastline, with its windings, is as long as the distance around the world at the equator. It has many fine harbors, and also places where one may go by water far into the land, such as the St. Lawrence River and Great Lakes, the Gulf of Mexico, and Hudson Bay. This shows us how well North America is suited for trading with its neighbors by sea.

The view gives us also an idea of the vast extent of North

America. The continent extends from near the North Pole almost to the equator, and therefore lies in the frigid, temperate, and torrid zones. It contains one sixth of all the land upon earth, and is surpassed in area only by Asia and Africa.

As we stand upon the moon, North America looks to us much as it does on a relief map. We can see that most of it is made up of plains which extend north and south between high plateaus and long mountain ranges, forming a great central valley or lowland. The green Appalachians, west of the Atlantic Ocean, mark the eastern side of the lowland. Far away to the west, washed by the Pacific Ocean, are the plateaus and peaks of the great Western Highland, and between lie the central plains of the Mississippi, the St. Lawrence, the Saskatchewan, and the Mackenzie rivers. The plains reach from the Gulf of Mexico to Hudson Bay and the Arctic Ocean. They slope so gently to the north and to the south that we could ride from one end to the other and hardly know that we were going up or down hill. These plains form one of the largest valleys on earth. The mountains have great beds and veins of minerals, and the valley has so much rich soil that it fills the meat and bread baskets of one tenth of the whole human race.

Let us now fix our telescopes more directly upon our own country. There, lying in the middle of North America, is the United States. Those broad lands at the north are the Dominion of Canada. Their area is even larger than the United States, but much of Canada is so far north that it has very long, cold winters and is hardly habitable. Mexico and Central America, which take up the southern part of the continent, are not one third the size of our country; they are too hot or too dry to be favorable homes for our



Relief Map of North America.

race. The United States is in the temperate zone, and it has the very best climate suited for civilized man.

And what a great country the United States is! Think of it; all of that land between Mexico and the Dominion of Canada belongs to us. From east to west the territory is so wide that it takes about five days and nights to cross it on a fast railroad train, and it would require several days to go from Mexico through the Mississippi valley to the Canadian boundary. It is one of the largest countries of the world, and, including Alaska, it has almost as much land as all Europe.

The United States is a treasure home of wonderful riches. The Appalachian Mountains have vast beds of coal, and the streams that flow down their slopes furnish electric power to thousands of factories. The Western Highland has enormous deposits of gold, silver, copper, and lead, and as we travel over it we shall see the miners taking the metal out of the rocks. There are wild animals in the mountains, and during our tour we shall have splendid hunting and fishing.

Lying between the Appalachians and the Rockies is one of the most fertile valleys of the world. See those silvery lines which wind their way through it. They seem but threads at this distance. They are really great rivers, which show that the lands through which they flow are well watered and well drained. That is the Mississippi valley, and the band of silver running through it from north to south is the Mississippi, which, with the Missouri, is the longest river on earth.

But what are those shining white patches west of the Appalachians? They look quite large as they lie there below us. They are the Great Lakes, some of the biggest bodies of fresh water on the earth. They are so big they seem almost like seas, and when we travel upon them we shall be often out of sight of land. See how far inland they extend from the ocean. With the St. Lawrence River they form a navigable waterway right to the heart of the richest lands of our continent.

The United States has millions of farmhouses, and much of the land is swarming with people. As we look through our telescopes the surface seems to be peppered with dark gray dots, and covered with a network of black lines. Those dots are the cities and towns, and the lines are the railways. Our country has several times as many miles of railway as any other great nation.

Railroad crossing Great Salt Lake. We shall make many journeys by rail.

The United States is one of the busiest of all lands. Its people number about one sixteenth of the whole human race. They are engaged in all kinds of work, and we shall visit many of them in our travels. The land is so vast that we hardly know where to begin to explore it. But there in the east is the capital, the city of Washington, and from that place we shall start.

1. What is the title of this book? From the table of contents, make an outline of the travels we are going to take. In what continent shall we travel? In what countries? In what country shall we spend the most time? Why?

2. Where does North America lie on the globe? In what zones? What ocean is at the west? The east? The north? What great continent is at the south?

3. What part of the land surface of the earth has North America? Compare it in size with the other continents. (See page 491.) Describe its coastline and how it is fitted for trade.

4. Bound the United States. What great bodies of water lie at the north? What gulf at the south? What river system drains the central plain? How does it compare in length with other great rivers of the world? (See page 495.)

5. Where are the highlands? The great lowlands? What do we mean when we speak of the United States as a farm? As a store? As a factory?

6. What is the population of the United States? Of the world?

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II. OUR NATIONAL CAPITAL

IT seems strange that our national capital should be so far away from the center of the United States. You might think it ought to be in the Mississippi valley, somewhere near St. Louis, and about halfway between the Dominion of Canada and the Gulf of Mexico. It lies on the Potomac River, about a hundred miles from its mouth, and is thus only a short distance from the Atlantic coast. It is on the eastern side of the Appalachian Mountains, a long way from the Mississippi valley, and thousands of miles from the lofty plateaus of the West. The inhabitants of Washington, Oregon, and California must travel five or six days if they would see the President; and, indeed, most of our people live many hundreds of miles from the national capital.

Now, the capital of a country is where the chief officers of its government live, and the people who have business with the government must go there to see them. If it were not for the railroads, this would be quite inconvenient; and were it not for the telegraph and telephone it would be almost impossible to govern the United States from a city so situated.

Why was the capital located so far from the center of the country?

The story is connected with the growth of our nation. When we Americans, by the Revolutionary War, became independent of Great Britain, we were few in number, and most of the people lived east of the Appalachian Mountains. The lands to the westward were held by wild Indians, deer and bears roamed through the dense forests, we owned no land beyond the Mississippi River, and no one imagined that the United States would some day extend to the Pacific Ocean. The site of Washington city was then in almost the center of the inhabited country, so that when a location for the capital had to be chosen, this was thought the best place. Congress was then sitting in Philadelphia. It was before the days of railways, and President Washington rode in a carriage to the village of Georgetown, which is now a part of the capital, and arranged with the farmers to sell their lands to the government. Soon after that the work of laying out the city began; but it was about ten years before the White House was finished and a building put up on Capitol Hill in which Congress could meet to make the laws.

The first President to live in Washington was John Adams. He came alone to the capital, leaving his wife to follow him. While traveling through the forest from Baltimore to Washington, she lost her way, and rode for miles without seeing a human being.

At that time a large part of Washington stood in the woods. There were stumps in some of the chief streets, and in wet weather Pennsylvania Avenue was almost a river of mud. The Congressmen and other officials did not like the new capital. They nicknamed it the "Wilderness City," the "City of Miserable Huts," and the "City of Streets without Houses." It grew steadily, however, and is now one of the finest cities of the world.

The plan of Washington is an excellent one. From the Capitol building as a center, the city is laid out in four sections, in each of which the streets cross one another at right angles, making them look as if four checkerboards had been joined together. Through the checkerboards, running diagonally in all directions, are wide avenues, and where these avenues cut across the streets there are circles or angular parks. These little parks have beds of flowers and beautiful trees. Many have statues of the great men of the past, and they form one of the chief beauties of the city.

Why were these parks so placed?

It was not so much for beauty as for defense. The man who planned Washington was a Frenchman, Major Pierre l'Enfant (pyâr län-fän)[1], who had left Paris about the time of the French Revolution, when the mobs were destroying the government. In laying out our capital he had the bloody scenes of Paris in mind, and he designed a city which might be easily defended. Each of the circles controls several streets, and a machine gun placed in its center could be whirled around and thus fire shot down a half dozen different streets.

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[1] For key to diacritic marks see first page of index.

We shall take an automobile for our tour through Washington. The city has more than two hundred miles of streets as smooth as a floor. They are paved with asphalt, and are lined with shade trees whose branches often meet overhead, forming long arbors of magnificent maples and elms. The city seems to be in a forest, with lines of houses rising out of the trees. Along many of the residence streets are wide strips of green lawn which extend from the sidewalks up to the walls of the houses.

We devote our first day to a run about the city. Some of the great government buildings are far apart; for example, it is a full mile from the White House to the Capitol, which is situated on a hill to the eastward. We drive toward it up Pennsylvania Avenue, a wide thoroughfare running diagonally across the city from southeast to northwest, and passing the State, War, and Navy Building, the Treasury, the Post Office Department, and many other important structures. We learn that this street is historically one of the most famous in the country. It is the route taken by each President of the United States when he rides to the White House from the Capitol on his inauguration day. It was here also that our armies paraded after the Civil War and the World War.

Farther on we come to the Library of Congress. It covers nearly four acres, and its golden dome, as big as the largest circus tent, can be seen shining in the sunlight for many miles about Washington. Its interior is of marble beautifully carved and decorated with paintings. The library has the largest collection of books in the Western Hemisphere, and it is surpassed in size only by the library of the British

Museum in London and the National Library of France in Paris. It has about three million books and pamphlets, and is of great value to people engaged in library and research work of various kinds.

Leaving the Library, we ride to the Navy Yard, on a branch of the Potomac. We visit the foundries where the great guns for our battleships are made, and then make our way back to the White House through the Mall. This park is filled with beautiful trees, under the branches of which we ride, passing the white stone building of the National Museum, and then on among the beautiful flower beds behind which stand the offices and laboratories of the Agricultural Department.

A little farther on, we leave the trees and enter the monument grounds, where, on a green mound near the banks of the Potomac River, stands the high stone shaft built in memory of George Washington. The monument is visible from any part of the city or country for many miles around. It seems to grow as we come toward it. It gets bigger and bigger, and as we walk up the little hill on which it stands, put our chins against its side, and look upward, it appears to be a great marble wall built right up into the sky.

The monument is made of blocks of white marble so closely fitted that we can hardly see where one stone joins another. It is fifty-five feet square at the base, and its slope is so gradual that, if one could slice off the top where the shaft begins to verge to a point, a house with four large rooms on each floor could be built there and its outer walls would not be outside the monument. There is an elevator inside this huge structure, and as we ride to the top our guide tells us it is more than five hundred and fifty-five feet in height.

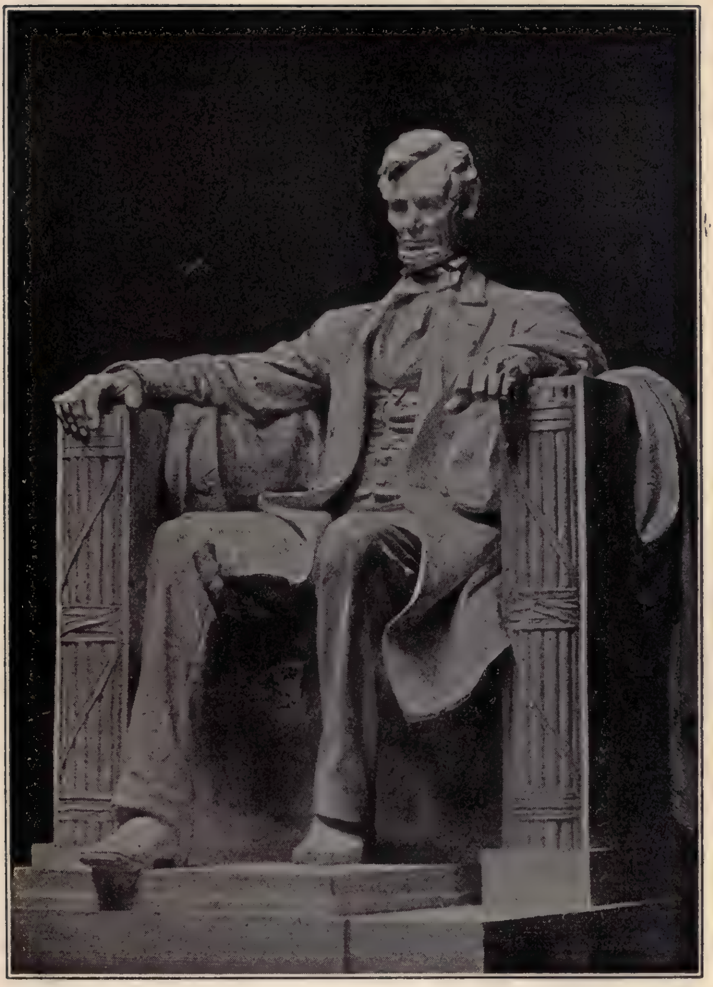
Reading room in the Library of Congress. It is open to the public and has space for 1000 readers.

As we stand here high up over the city and look toward the west, we are facing the beautiful white marble memorial building erected in honor of Abraham Lincoln. It is nearly a mile away on another mound in Potomac Park. Looking to the east, we see the Capitol. It is in a direct line with the Lincoln Memorial and also with Arlington Cemetery in Virginia, which we can see on the other side of the Potomac River. In that cemetery are the graves of thousands of soldiers who died in the Civil War.

Turning from the west to the north, we see some of our chief government buildings. Almost at our feet lie the huge concrete structures built during the World War for the Army and Navy departments, and farther north, rising out of the houses, is the white stone building of the Department of the Interior, so large that it has two miles of corridors inside its walls. A little farther east is the State Department building, another huge structure. Almost adjoining it is the White House, where our President lives, and across the way is the somber gray tomb-like Treasury. (See Frontispiece.)

We look at our watches and find that it is too late to do much more to-day. It is now almost half past four o'clock, and the government offices are ready to close. We drop down to the ground and walk across the park to the Treasury, where a great crowd of men and women are pouring forth from the doors. At the same time the War and Navy and other departments are dismissing their employees, and the streets are swarming with men and women clerks on their way home from work.

We find that it takes several hundred thousand people to do the public work of the United States, and that more than one hundred thousand are required to keep the books and carry on the national business at Washington.



Gigantic statue of Lincoln in the central hall of the Lincoln Memorial. It is 30 feet high and contains 175 tons of white marble. It is the work of Daniel C. French.

III. A VISIT TO THE PRESIDENT AND TO THE HALLS OF CONGRESS

OUR first trip to-day shall be to the White House. We are to meet the President, and after that we shall go to the Capitol and see something of Congress and the Supreme Court.

Our government is composed of three branches: the legislative branch, or Congress, which makes the laws; the executive branch, consisting of the President and his officials, which carries out the laws; and the judicial branch, or the courts, which in cases of dispute tells what the laws mean. The President might be called, in fact, the business manager of the United States. He is elected for a term of four years.

We stroll up past the Treasury, and soon come to the White House grounds. The gates are wide open, and we walk undisturbed along the roadway which leads to the lofty porch before the front door.

Here we stop to take a good look at the White House. It is made of sandstone, but is so painted that it seems like a marble palace shining out of the big trees which surround it. A lawn of velvety green lies between it and the sidewalk, and on our way in we pass a fountain which sends thousands of silvery drops high into the air. The doors before us are of plate glass set in brass frames. A little farther in are other doors of polished mahogany which have brass knobs decorated with stars.

Now the doors have opened and a messenger invites us to enter. We take a few steps and are in the Executive Mansion, the home of the President of the United States, where all our Presidents have lived since the year 1800.

The Executive Mansion was the first public building erected at our national capital. George Washington selected the site, and was present when the cornerstone was laid. He lived to see the building completed, and it is said he walked through it only a few days before his death in 1799. His successor, John Adams, was the first President to occupy the Executive Mansion. During the War of 1812 the British captured the city and set fire to the building. Much of the woodwork was burned, and the stone walls were blackened. When this building was repaired, the walls were painted white, and from that came the name "the White House," by which it is commonly known to this day, although its usual official title is the Executive Mansion.

The first room we see shows us the size of the building. It is called the Vestibule, but is four times as big as the ordinary parlor. It has a high ceiling upheld at the back by white pillars, beyond which is the corridor leading to the reception rooms.

Turning to the left through this hall, we enter the East Room, which takes up the whole east side of the White House. Its ceiling is about twice as high as that of our schoolroom. The floor is of wood, beautifully finished, and so brightly polished that it shines like a mirror.

The walls of the East Room are decorated in white, and from its ceiling hang chandeliers, upon which are thousands of pieces of cut glass. In the walls are set four huge mirrors, each as big as the largest store window, in which, when the chandeliers are lighted for the President's evening parties, the glass pendants shine like diamonds. At such times there are often great banks of cut flowers below the mirrors, and flowers and ferns are wreathed throughout every part of the room. There are palm trees

East Room in the White House. The crystal chandeliers are famous for their beauty.

and tropical plants in the corners and in the windows; the parlor is filled with gayly dressed people, and the whole makes one think of fairyland.

At the end of the East Room we turn to the right and enter the Green Room, a parlor furnished in green and silver, and from there go into the famous Blue Room, where the President stands with his wife and shakes hands with those who come to his evening receptions. The Blue Room is oval in shape. Its furniture is of wood decorated with gold leaf, and cushioned with blue satin fine enough for the dress of a queen.

Farther on is the Red Room, the walls of which are decorated with red silk velvet, and beyond it is the state dining room, where the President gives his dinners to the highest officials and other people of note. This room is paneled with oak, beautifully carved. The mounted heads of moose, buffalo, and bear, and others of the big game of America, look down upon us, and we are told that the animals which once wore the heads were shot by Theodore Roosevelt.

We are in the state dining room when a messenger tells us the President has consented to see us. His offices are at the western end of the grounds, connected by a passageway with the main body of the White House. We go with the messenger, and a moment later are standing in the presence of the Chief Executive of the United States. He rises and offers his hand, and we are somewhat surprised to find that he is not very different from many men we have known. He treats us kindly, and chats with us for a few moments about himself and his work.

The President of the United States has a great deal to do. He has a great number of officials under him, both here and in all parts of the country; and he is kept busy

The National Capitol; also the Library of Congress (in background), and House Office Building (at right).

from daylight to dark directing the affairs of the government. As we wait we hear the click, click, click of telegraph instruments, and are told that operators are kept in the White House to send out the President's orders to all parts of the United States, while across the Potomac are three tall steel towers from which his messages are sometimes sent by wireless to all parts of the world.

Later on we are shown the Cabinet Room, where, once a week or oftener, the President advises with the men who have charge of the different departments of the government. Here he counsels with them as to their business, and as to other affairs affecting the welfare of the nation.

We have now left the White House, and have made our way up Pennsylvania Avenue to the National Capitol. What a beautiful building it is! As we look up at it from the edge of the park which surrounds it, it appears like a huge marble palace with an enormous white dome floating, as it were, in the blue sky. As we come nearer, the building seems to grow larger and larger, and we believe the guide when he tells us it is not only one of the most beautiful buildings, but also the largest of its kind ever erected. It covers three and one half acres of ground, and it has so many rooms that there are parts of it in which we might get lost and wander about a long time without finding our way out.

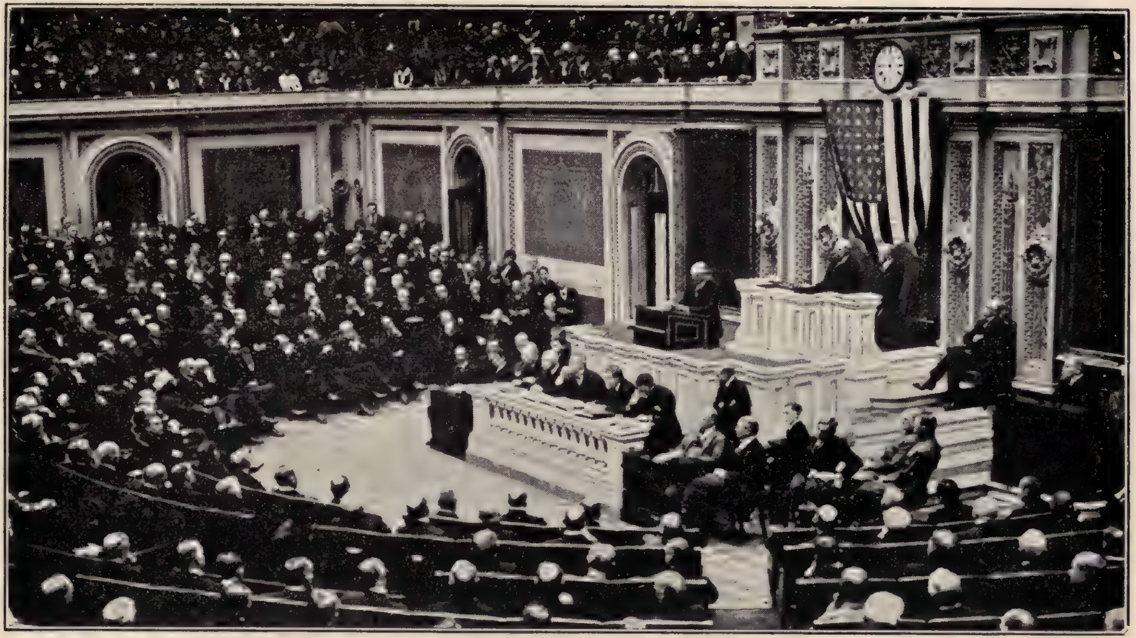
Entering the Capitol, we pass through halls swarming with people. It is a city in itself, the chief business of which is to make laws for our nation. The two great lawmaking bodies are at opposite ends of the building. In the south wing is the hall of the House of Representatives, and in the north the chamber of the United States Senate, while a wide corridor runs through the building from the one to the other.

We enter at the House side, and, pushing our way through the crowd, soon find ourselves in the gallery of the House of Representatives. The floor below us is so large that it could be divided into twenty-eight parlors, each sixteen feet square. The galleries are high above it, near the ceiling; they slope down to the edge of the central pit where the representatives sit.

As we sit in the galleries, we can look down into this pit upon our congressmen at work. Each representative has his own chair, the seats running around the room in the shape of a half-moon about a high platform at one side of the hall. Upon the platform is a marble pulpit, with the American eagle above it. That pulpit is the Speaker's desk, and the man who sits behind it is the Speaker of the House, who keeps order and says what shall be done. He has an ivory-headed mallet with which he pounds on his desk to make members stop their conversation during the speaking.

But who are those boys with the bright silver badges about the size of a half dollar on their coats, running to and fro with letters and papers in their hands? They are not much older than we are, but they seem busier than any one else in the hall. Those are the pages, who run errands for the congressmen. When a congressman wants a page, he claps his hands, and the boy runs to him from his seat on the steps of the Speaker's platform to get his orders. Other pages do the same work in the Senate.

We ask as to the duties of the representatives in Congress. In connection with the senators, they make the laws to govern our country. A proposed act becomes a law when it has been voted for by a majority of the Senate and by a majority of the House of Representatives, and has been approved by the President.



The President addressing Congress, in the Hall of the House of Representatives. The gallery for visitors extends all around the Hall.

And how do these men become Congressmen?

The people of the United States choose the senators and representatives. The states are divided into congressional districts, each containing about the same number of people. Every district has the right to one representative in Congress, and its voters choose who he shall be. He is supposed to act for them. The senators represent the states rather than individual districts. There are only two from each state, Nevada having just as many as New York, which has more than one hundred times as many people.

The representatives are elected for only two years, while the senators are chosen for six. The representatives elect their own Speaker or presiding officer, but the Vice President of the United States is the presiding officer of the Senate.

It is in the halls of Congress that legislation is enacted, and that the speaking upon public measures is done. Most of the work of the Congressmen, however, is carried on outside the Capitol in the two great marble structures near by, known as the Senate Office Building and the House Office Building. Here the senators and representatives have their offices, where they write letters and prepare the bills and other measures which are discussed in the Capitol. About fifty thousand bills are introduced into Congress in one year, and those which become laws must be carefully worded, as the use of a wrong word or even the misplacing of a comma or period might affect appropriations calling for a million dollars or more. The two office buildings and the Capitol together contain about fourteen hundred rooms and forty elevators.

Let us now leave Congress and take a look at the Supreme Court. We push our way through the crowd about the doors of the House of Representatives, and pass on into a hall filled with the marble statues of some of the great men of our history.

We go through the rotunda, or circular room under the dome, and then on into the passageway which leads to the Senate Chamber.

Here we are stopped by a messenger while a curious procession crosses the hall. It consists of nine men in long gowns of black silk. How dignified they seem, and how quiet every one is as they go by! Those are the Supreme Court justices. They are the heads of the judicial branch of our government, and are on their way to the courtroom.

Now they have passed, and we can go into the same room, though by another door. We enter just in time to hear the marshal of the court cry out:—

"Oyez! Oyez! Oyez! All persons having business before the honorable Supreme Court are admonished to draw near and give their attention. The court is now sitting. God save the United States and this honorable court!"

He sings this out in loud tones, running the words together into one sentence, and saying them all in a breath.

As he does so the justices are seating themselves behind a long mahogany table on a platform at the back of the room, their armchairs resting against columns of black-and-gray marble. The chief justice is in the center. His chair is under a purple canopy, out of which a golden American eagle looks down with keen eyes, holding in its beak a strip of metal upon which are painted the words, "In God we trust."

The lawyers and others who have business before the Supreme Court are seated in a little inclosure below the bench. Back of them, against the wall, are the visitors, including ourselves.

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It is usually quiet in the Supreme Court, for this is a very dignified branch of our government. It is so quiet to-day, in fact, that we feel like going to sleep after our hard day's sightseeing. We are frightened as we catch ourselves nodding; and we rise, slip gently out, and make our way back to our hotel.

1. Locate our national capital and tell why it was placed where it is.

2. How far do you live from Washington? How could you go there by train? On what railways? How long would you be on the way? At a mile a minute by airplane, how long would it take? Over what ranges of mountains, if any, would you pass? Through what states? Through what large cities? Bring a railway map to the class and show the route.

3. Have you ever visited Washington before this? Do you know any one who has?

4. Describe your automobile trip through the capital. How was the city first planned, and why? What two great monuments do we see? Tell the story of each of the Presidents to whom they are erected.

5. What are the three principal branches of the government? What is the chief duty of each?

6. What is the White House? Describe your call upon the President. What is the Cabinet?

7. Describe your trip through the Capitol. What is the difference between the House and the Senate? Who are your senators? Who is your congressman? Tell about our visit to the Supreme Court.

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IV. DEPARTMENTS OF THE GOVERNMENT—STATE, NAVY, AND WAR

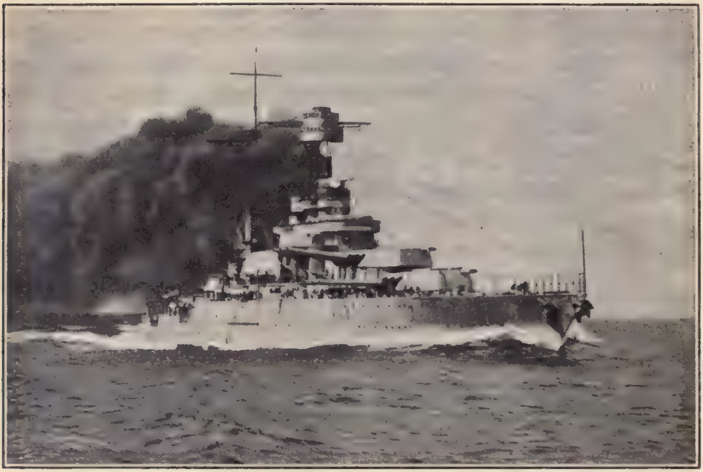
THIS morning we shall visit some of the department buildings to find out, if we can, how the important business of our government is carried on. We shall pay our first call upon the Secretary of State. He is considered the most important member of the Cabinet, and if a time should ever come when the President and Vice President should both die, the Secretary of State would become President.

The State Department has charge of all the business between the United States and foreign nations. Each of the important foreign countries has its representative at Washington, and our President appoints ambassadors and ministers to represent the United States at foreign capitals, and consuls or business agents in every great trading center abroad. The Secretary of State confers with the foreign ministers, and he advises with the President as to treaties and all foreign business. He also issues passports to Americans who wish to travel through other lands on business or pleasure. Each passport bears a photograph and description of its owner. It shows that he is an American citizen, and asks that the people of the countries through which he wishes to go treat him as such and allow him to pass safely and freely.

The Secretary of State has charge of our treaties or contracts with all foreign nations, and also of other important state papers. The original of the Declaration of Independence, and the little desk upon which Thomas Jefferson wrote it, were kept here for many years, but were then removed to the Library of Congress.

Leaving the State Department, we stroll down past the Cor′coran Gallery of Art, the building devoted to the American Red Cross, and the white marble palace of the Pan-American Union, to the offices of the Navy Department. We know that we are in the Department of the Navy as soon as we enter the building. There are models of war vessels in the halls, and in some of the rooms we see photographs of dreadnaughts, cruisers, torpedo boats, submarine chasers, and all the other kinds of warships in our navy.

Here, for instance, is a model of one of our great battleships. It is so small that it could be put in one side of a schoolroom, but the ship it represents is as long as a city block and so wide that it would fill an ordinary street. The ship cost more than twenty million dollars and required more than two years to build. It is made altogether of steel and its outside is covered with steel plates several inches thick, in order that the shells fired at it may not go through.



The Tennessee, one of the navy's largest battleships.

The guns of the battleship are of many kinds. It has some so big that it takes two bushels of powder to fire one of them and so powerful that they will shoot shells of solid steel twelve miles or more. These shells are as tall as we are and weigh more than seven full grown men. The ship has anti-aircraft guns to defend itself from the war planes of an enemy, and guns which fire depth bombs to destroy submarines as they lie in wait far down under the surface of the water. These things show us how terrible war is and how all nations should strive together for peace in the world.

We feel this the more during our visit to the War Department, which has to do with the army. Uncle Sam must have his soldiers upon land to defend us, as well as his ships upon the sea; and in time of war it has been necessary to call out millions of the young men of our nation to fight for our rights and for the good and peace of the world. In the World War we had at one time nearly four million men under arms, over half of whom were in France, having been safely transported there under the protection of the American and British navies. In times of peace less than two hundred thousand troops are required to protect our country with its millions of people.

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V. DEPARTMENTS OF THE GOVERNMENT—TREASURY

GOING back to Pennsylvania Avenue, we visit the Treasury Department, which has to do with the money of the government. Enormous sums are needed to pay the expenses of the army and navy, to carry the mails, and to perform other kinds of work done by the national government. Nearly all of this money comes from taxes of various kinds. It is the business of the Treasury Department to collect this money and to see that none of it goes out except as the laws of Congress direct. The

Treasury Department has charge also of our national banks and of our public debt, and it is the guardian of the financial resources of the United States.

Much money collected from taxes and other sources is sent to the Treasury Department to be kept until needed, and there is usually an enormous amount on hand. Our guide takes us down into the vaults and shows us how hundreds of millions of dollars' worth of gold and silver are stored there, being guarded day and night by watchmen. In other rooms we are shown great piles of bonds. We see also bundles of new bank notes stacked up, filling the vaults from the floor to the ceiling, and watch the hundreds of clerks who are handling old and new paper money.

Vault in Treasury Department filled with sacks of silver dollars.

The Treasury Department coins or prints all the money of the United States. The gold and silver and copper coins are made at the mints in Philadelphia, Denver, and San Francisco, but the currency, as our paper money is called, is manufactured in Washington.

The money factory is known as the Bureau of Engraving and Printing. It is a large stone and brick building which lies on the banks of the Potomac just beyond the Washington Monument, and we go there to see it. We hear the rattle of machinery as we enter the door, and the guide takes us through room after room where, behind iron latticework, scores of men and women are busy printing bank notes and bonds. The women wear aprons over their dresses, and the men have their shirt sleeves rolled up to their shoulders. The printing is dirty work, and every one in the press room is spotted with ink. In another place we see the engravers, who with sharp tools are cutting in steel plates the fine pictures printed upon our bank notes, and in other rooms we watch the wonderful engraving machines which do the scroll work.

How carefully everything is guarded! Watchmen are stationed in each room during the day, and there are steel vaults where the plates for making the bank notes are stored away at night. Not one of the employees can leave the building until every note on hand has been counted and every sheet of paper and every printing plate is known to be in its place. This is to prevent counterfeiters from stealing the paper and plates and printing money for themselves.

As we go through this building we get some idea of the wealth of our nation by seeing the great volume of money required for its business. Bank notes representing millions of dollars are printed here in one day. There are scores of women who do nothing else but count bank notes. How fast they work! Their fingers go like lightning. They do not move their lips, but they are counting the bills at the rate of a hundred a minute.

After being counted, the notes are tied up in packages and put into a great steel box upon wheels and taken in a well-guarded motor car to the Treasury Department, from which they are shipped to all parts of the country. Uncle Sam never sends out a bank note a second time. He is like the old peddler in the story of Aladdin, always ready to exchange new goods for old ones.

But what becomes of the old bank notes?

Come with me and we shall see. All of the old money is destroyed. As soon as the bank notes come into the Treasury they are cut in halves and taken to the basement of this money factory. There the cut notes are put into a big round iron pot, in which they are ground up by machinery and cooked and steamed until they become a pulpy mixture, which looks like oatmeal porridge or mush. Notes that once represented several million dollars often form the grist for one grinding. Think of a pot of mush made of two million dollars in bank notes! Would you not like a good bowl of the meal before it is cut up and thrown into the kettle? Yes, but alas, there is no chance for us to get at any of this money. The government grinds it up in order to prevent any one from stealing the notes and using them as money again.

It is in the Bureau of Engraving and Printing that our postage stamps are made. The process is much the same as that of making bank notes, and the stamps are just as carefully watched that none may be lost. After printing they are gummed by machinery. Then the little holes are cut around them with sharp wheels on somewhat the same principle as dough is cut in making animal crackers. The government sells more than eleven billion postage

Perforating sheets of postage stamps. The stamps are printed and gummed by other machines.

stamps every year, or more than a thousand for every man, woman, and child in our country. The stamps range in value from one cent to five dollars. A single two cent stamp is all that is needed to carry the story of what we have seen this morning to any home in our country.

1. If both the President and the Vice President should die, who would become President?
2. What is the business of the State Department?

3. If you were going abroad how would you show that you are an American citizen?

4. What is a treaty? Why is it necessary to have treaties?

5. What was the Declaration of Independence? Who wrote it?

6. Why does the government of the United States need an army and navy? Do you know any one who has served as a soldier or a sailor? Where did he serve? What did he do?

7. What is the business of the Treasury Department? Why do we have to pay taxes?

8. Where is our paper money printed? Read the wording on the face of paper money. Where are postage stamps printed?

VI. DEPARTMENTS OF THE GOVERNMENT — JUSTICE, POST OFFICE, COMMERCE, LABOR

LEAVING the Treasury, we visit the Department of Justice. Here we call upon the Attorney-General, who is the chief law officer of our government. It is important that our public affairs should be conducted according to law, and the Attorney-General, who is a trained lawyer, gives his advice to the President or to the heads of the other executive departments as to any questions of law that come up. He appears before the Supreme Court and Court of Claims in important government cases, and has the superintendence and direction of the United States attorneys and marshals in different parts of the Union.

Our next call is upon the Postmaster-General. We find him in the gray stone building on Pennsylvania Avenue, which is devoted to the Post Office Department, but his business extends to every nook and corner of the United States, and to every city and town of the world. He has under him hundreds of thousands of clerks, postmasters, and rural delivery agents. The mail goes by railway, steamship, and motor car, and on horseback, and on foot. Some of the fast mail is sent by airplane, saving thereby many hours in the delivery of letters.

The government does a great express business through the post office, carrying billions of parcel post packages every twelve months, and it acts as a banker, sending more than one billion dollars' worth of money orders through the mails of the United States alone in one year. It sends also money to foreign countries, and during the World War orders for over thirty million dollars were issued and these moneys were paid to the persons who received them in the lands overseas. We have also postal savings banks, where hundreds of thousands of people deposit their money, receiving interest thereon as long as it is left in the bank.

As we go through the Post Office Department, we see the clerks working in the offices devoted to the various branches of the service. In the foreign mail division we learn that all the nations of the world have joined together as to their mails, and that for two cents one can have a postcard carried to almost any place upon earth, and for five cents a sealed letter to the most distant part of the globe.

In another building we visit the dead letter office. When a letter is so badly addressed that the postman cannot read the writing, or when he is unable to find the person to whom it is directed, it is returned to the sender, if his address is given on the envelope. But if the letter can neither be delivered nor returned, it is called dead. It is then forwarded to the dead letter office, where it is opened by the clerks and if possible sent back to the writer. Millions of dead letters are received here every year. The signatures to many of them are so poorly written that they cannot be made out, and in many other cases the writer's address is not given. Some of the letters contain money, and we are

The city post office of Washington. The Post Office Department occupies other buildings.

told that notes and drafts worth more than a million dollars are mailed annually in envelopes so badly addressed that they come to the dead letter office. In some cases the writing cannot be read and both money and letters are lost to their owners. From this we see how important it is to learn to write well, and also to put one's address on both letters and envelopes.

Leaving the Post Office Department, we take the electric cars for the Department of Commerce. This is one of the most important of all the branches of our government business. It has to do with the United States as both store and factory. Its business is to foster and develop our foreign and domestic commerce, as well as our manufacturing, shipping, and fishing industries. It makes charts of the coasts and coastal waters of the United States, showing where it is safe for vessels to go, and keeps lighthouses along the rocky shores for the protection of our steamers. It sees that all steamers are fitted out with life preservers; and that they have wireless telegraph equipment, so that they can call for aid in case of a wreck.

The Bureau of Fisheries helps to protect our great fishing industry, plants new fishing grounds, and keeps up the old ones. The Bureau distributes more than three billion eggs and fish every year, of which more than two and a half billions are tiny fish known as fry. The waters of the United States give us more than sixty million dollars' worth of food every year, including the oysters and clams we find so delicious.

The Secretary of Commerce has charge of the Census Bureau, whose business it is to count our people every ten years so that we can know just how many citizens we have and what they are doing. He tells us that we are rapidly increasing in population, and that we now number about one sixteenth of the whole human race. He says that we have the greatest commerce of all nations, and that our country and people are steadily growing in manufactures and wealth.

It is not far from the Department of Commerce to the Department of Labor, where we meet the men charged with the duty of promoting and developing the welfare of the wage earners of the United States. Nearly all of our people do work of one kind or another, and the Secretary of Labor aids in seeing that they are fairly treated by their employers. He also collects information regarding their wages, and hours of work in this and other countries. He has charge of administering the laws by which foreigners may come into this country, and of showing them how to become American citizens.

During our stay in this department we visit the Children's Bureau. This bureau investigates and reports upon all matters relating to the welfare of children among all classes of our people. It helps to see that no child is employed in a dangerous occupation, and that he is not put to work in factories before he is fourteen years of age, and in mines or quarries until he is sixteen or over.

VII. DEPARTMENTS OF THE GOVERNMENT—INTERIOR AND AGRICULTURE

THIS is our last day in Washington, and there is so much more to see that we hardly know where to begin. We shall devote the time to learning something about the great resources of the country we are to explore. We can do this best by visiting the Department of the Interior and the Department of Agriculture.

The Department of the Interior has charge of all patents, pensions, and public lands. It takes care of our national parks, and of the reclaiming of our waste lands in deserts and swamps, Belonging to it also are the Geological Survey, some of whose employees are engaged in making maps of the country, and the Bureau of Mines, which looks after our vast mineral wealth.

The Interior Department has charge of educational matters, and of the Indians, and of many things in Alaska, including the reindeer. In the educational bureau we are told that there are more than sixteen million children in daily attendance in our public schools, and that one million children are now enlisted in the school garden army. From the school gardens of the United States now comes annually more than ten million dollars' worth of food.

In the Geological Survey we see maps of the counties in which we live, showing all the hills and hollows, and in the Bureau of Mines we learn much about the riches of our country buried in the rocky heart of the earth. The United States has more of many minerals than any other country. This is true of copper and zinc, and of coal, petroleum, and iron. We have coal in thirty different states, and it is said there is enough to keep us going for seven thousand years if we do not increase the amount we are using. We are producing more than half of the petroleum that comes from the earth, and we have so much water power that if it were all put to work it could operate our factories, run our railways, and light and heat all of our homes.

The Department of Agriculture is, if anything, even more interesting than the Department of the Interior. The United States has more than six million farms, which produce enough grain in one year to give more than two hundred bushels to every family in our whole country. In some years we produce one fourth of all the wheat raised on the earth. Moreover, our farm animals are so many that if we could round them up and divide them evenly among us, every family would have three hogs, three cattle, two sheep, and a horse. In addition there are tens of millions of turkeys, chickens, and ducks. When we think of all this we wonder how an American stomach can ever go empty.

The Department of Agriculture is always studying the needs of our farmers and trying to help them make their lands produce more. It has men traveling over the world to find new seeds and plants, and it suggests new crops and new methods of farming. It is doing a great work, in teach-

In the laboratories of the Department of Agriculture, scientists experiment with plants from all over the world.

ing the children how to raise certain crops and make money out of rearing farm animals. For this purpose it has established corn clubs and cotton clubs and canning associations in thousands of farming localities. There are clubs of boys and girls who raise poultry and eggs, and hundreds of boys' clubs whose members rear sheep, cattle, and pigs according to the rules sent out by this department. In a great many cases the boys of these clubs have more success with their animals than their fathers who farm in the old-fashioned way. We shall visit some of these clubs in our travels.

At the suggestion of the Secretary of Agriculture, we visit the Weather Bureau, which has charge of the daily reports as to whether it will rain or snow or be clear in each part of the country. The Bureau employs all the time about eight hundred expert weather observers who are located at several hundred stations throughout the United States and the West Indies. They telegraph daily reports as to the weather conditions of their localities. From these the Bureau can judge which way the winds and storms are going, and the possibilities of rain and snow. The Bureau receives two sets of weather telegrams from its observers every day, one at 8 a. m. and one at 8 p. m., and it is from these that it makes the weather charts and forecasts for the next thirty-six hours. The forecasts are telegraphed all over the country, and also to vessels about to sail over the oceans. They are published in the weather maps and in the newspapers, and are of very great value to many classes of people. The warnings for a single hurricane have kept in port vessels containing cargoes valued at more than thirty million dollars, and the warnings of frost during one cold wave saved oranges and lemons worth fourteen million dollars.

After watching the men making weather maps, we go to the Forestry Service, which has charge of our national woodlands and timber supply. The officials tell us that a third of the United States was once so covered with trees that one could ride for days and months and not get out of the woods. But the people wanted the land for farms, and they destroyed the trees in every possible way. Many were burned to get rid of them, and those used for lumber were so carelessly cut that much of the best wood was lost. We have still a great deal of forest, but the trees are being cut down so rapidly that the time may yet come when we shall not have enough lumber for our houses. The officers tell us that we are felling so many trees every year that if sawed into boards they would make a plank road a foot thick, wide enough for two big motor cars abreast, and so long that it would reach as far as from the earth to the moon. They give us maps of our chief forest regions, and we decide to visit them during our travels.

1. What officer is at the head of the Department of Justice?

2. What is the business of the Post Office Department? Who is the representative of this department in your town?

3. What is the rural delivery service? The parcel post service? What are dead letters, and how are they cared for? Why?

4. Why do we need a Department of Commerce? Of Labor? Mention some of the duties of each.

5. Describe the work of the Department of the Interior.

6. What department helps the farmers? How many farms have we in the United States? What do you know of the boys' corn clubs? Of the girls' canning clubs? Of the pig clubs? Why are they formed?

7. Why do we need a Weather Bureau? Get a weather report and tell what it means.

8. Why do we need a Forestry Service? What is the duty of this service?

VIII. BALTIMORE AND THE OYSTER BEDS

WE leave Washington this morning on our way to New York. The Baltimore and Ohio and the Pennsylvania railways, which run between the two cities, have fast express trains that make the journey in a little more than five hours. But as the country is thickly populated, and we shall pass through several large cities, we shall stop off on the way.

We take automobiles to the Union Station, which is not far from the Capitol. It is a white granite building covering almost six acres, surrounded by beautiful grounds with a marble statue of Columbus before the entrance. We buy our tickets and are soon on the train. We reach Baltimore in less than an hour.

Baltimore is one of the chief ports of the Atlantic seaboard. It lies on the Patapsco River near the head of Chesapeake Bay. The largest ocean steamers can come in from the Atlantic Ocean through Hampton Roads and sail up the bay one hundred and fifty miles and land at its wharves; and several trunk lines of railway connect it with all parts of the United States. One of these, the Baltimore and Ohio Railroad, uses the gateway of the Potomac valley through the Appalachian Highland to the west. Baltimore is near the coal fields of Virginia, West Virginia, and Pennsylvania, so that it has cheap fuel for manufacturing. It has steel plants and shipbuilding works, and it refines a great deal of copper. It makes more fertilizer, straw goods, and cotton duck than any other of our cities, and as it is in a rich gardening and fruit-growing region, its canneries put up great quantities of fruit and vegetables which are shipped to all parts of the Union.

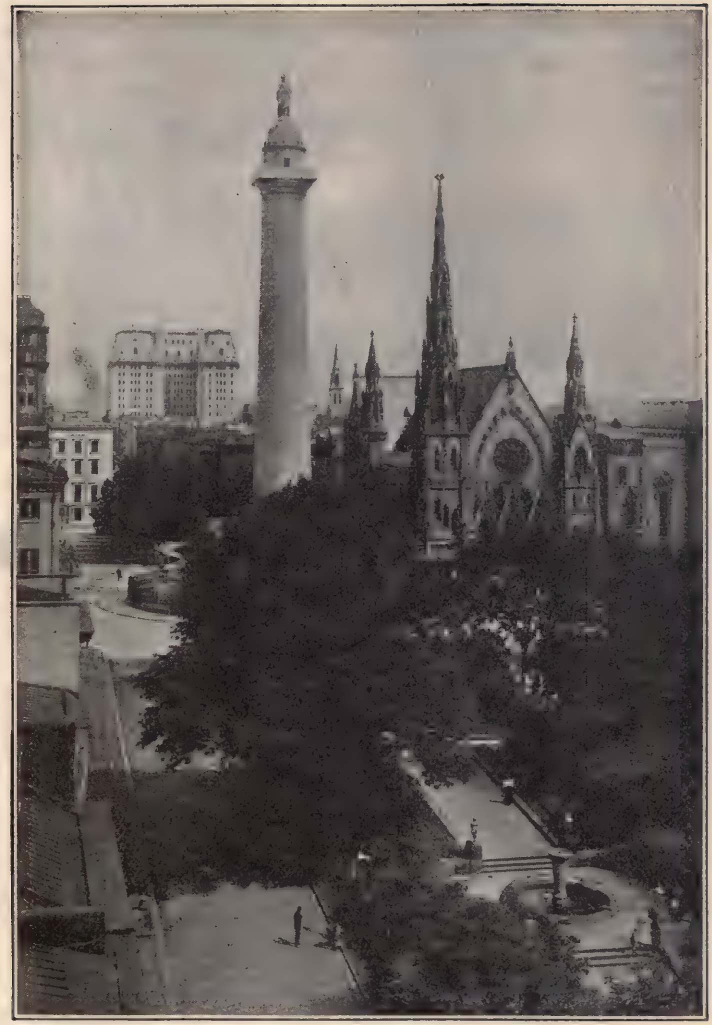
We go first to the harbor, which covers more than six hundred acres. There are large ocean steamers unloading bananas, pineapples, coconuts, and sugar from the West Indies, and some taking on corn, wheat, flour, cotton, tobacco, copper, and coal for shipment abroad. The goods are put on and taken off the ships with hydraulic cranes, and the wheat from the great elevators is poured down through pipes into the vessels.

While visiting the harbor we hire a boat and get a view of Fort McHenry, whose bombardment by the British in 1814 caused Francis Scott Key to write "The Star-spangled Banner." You may remember the story. It was during the War of 1812, when the British fleet had attacked Fort McHenry, and Mr. Key, having gone out to one of the ships under a flag of truce, was detained there during the fighting. As he watched the firing throughout the night, his heart was sick with anxiety; for he could not tell whether the fort had fallen until the day broke. He then saw that the flag was still flying, and on the inspiration of the moment wrote the verses of the song on the back of a letter before leaving the ship. As we look at the place, the words come to us and we sing:—

"Oh, say, can you see, by the dawn's early light,
  What so proudly we hailed at the twilight's last gleaming?
Whose broad stripes and bright stars, through the perilous fight,
  O'er the ramparts we watched, were so gallantly streaming?
And the rockets' red glare, the bombs bursting in air,
Gave proof through the night that our flag was still there:
Oh, say, does that star-spangled banner yet wave
O'er the land of the free and the home of the brave?"

It was in Baltimore that Randall wrote his song, "Maryland, My Maryland," and here Edgar Allan Poe began his career as a writer of poems and stories.

When Washington was laid out, Baltimore had already



Scene in the heart of Baltimore, showing Mount Vernon Place and the Washington Monument.

eight thousand people, and it was considered one of the chief towns of the country. It now contains about three quarters of a million, and is our largest city south of Philadelphia. We visit Druid Hill Park, and the Johns Hopkins University, and then we take a look at the monument which Baltimore has put up in honor of George Washington. It is a marble shaft one hundred and sixty-four feet high, with a statue of Washington on top. It seems small in comparison with the huge structure we saw at the national capital.

We find ourselves very hungry after our rapid tour of the city, and decide to lunch at the station before we go on to Philadelphia.

What shall we eat?

We order oysters, for Baltimore is the chief oyster and crab market of the world. More than one third of all our oysters are grown in the waters of Chesapeake Bay, and as many as fifteen million crabs are caught there in one year. In Baltimore there are many thousand men and women who do nothing but take oysters out of their shells in order that they may be shipped in tubs and cans to different parts of the country. We Americans eat more oysters than the people of any other nation. We consume in one year enough to give one dozen to every man, woman, and child on the globe, and still leave some to spare.

Oysters grow nearly everywhere in the shallow waters along our seacoast, but we have larger oyster beds and more good oysters in Chesapeake Bay than anywhere else. Most of the oysters grow of themselves; but there are also oyster farms, where shells are thrown into the water and seed oysters are sown. The young oysters fasten themselves to the shells and by and by grow shells of their own.

The oysters are gathered during the fall and winter by men who sail in boats over the beds where they lie. The men have long rakes, which they push down into the water and thus drag up the oysters. Sometimes they use dredges, or great shovels worked by machinery, which scoop the shellfish up from the bottom of the bay.

Emptying oysters from a dredge on the deck of a large boat.

But here come our oysters. What queer-looking things they are as they lie on the shells! They have mouths, but no heads. The mouth is in the narrowest portion of the body. It is merely a hole in the skin, for the oyster has neither tongue nor teeth. The mouth has four thin lips, and the oyster gets its food by filtering through them the water which it takes into its mouth. It has no nose and no eyes, but scientists say that it will close up its shell if a shadow passes over the water above it. Hence it must

have some way of knowing what is going on about it. The oyster has gills and a heart. Its stomach is a little bag which lies just behind the mouth.

As we think of these things, we almost hesitate to let the oysters slip down our throats. We try one, however. The delicious taste takes away our scruples, and we find ourselves eating a dozen before we are satisfied.

1. Locate Baltimore. What advantages has it for commerce by sea? By interior waterways? By railways?

2. On a globe trace a shipment of corn from Baltimore to Liverpool. To Hamburg. Of tobacco to Marseille. Trace a shipment of oysters from Baltimore to Chicago.

3. Make a trip to Baltimore from your home town, giving the distances and the names of the railways over which you go.

4. Compare Baltimore in size with five of the largest cities of North America. Of South America. What cities of Europe are of about the same size?

5. Why is Baltimore famous as an oyster market? Describe the oyster industry, and tell all you can about oysters. (See Carpenter's "How the World is Fed," page 171.)

6. From what oysters do the pearls of commerce come? (See Carpenter's "How the World is Clothed," page 299.)

IX. PHILADELPHIA—A VISIT TO THE MINT

A CAR ride of ninety-seven miles takes us from Baltimore to Philadelphia in less than three hours. We cross the wide Susquehanna River near where it flows into Chesapeake Bay, and a little later we stop at the manufacturing city of Wilmington, Delaware, near where General Washington fought the British in the battle of Brandywine.

Long before we reach Philadelphia itself we see many great factories and realize that we are in one of our chief industrial centers. There are only two cities in the United States that have more manufacturing establishments than Philadelphia, and they are New York and Chicago. There are several hundred thousand men and women here who make things to sell. Thousands are busy weaving cotton, woolen, and silk into cloths and carpets, and thousands are making knit goods, shoes, felt hats, and other clothing.

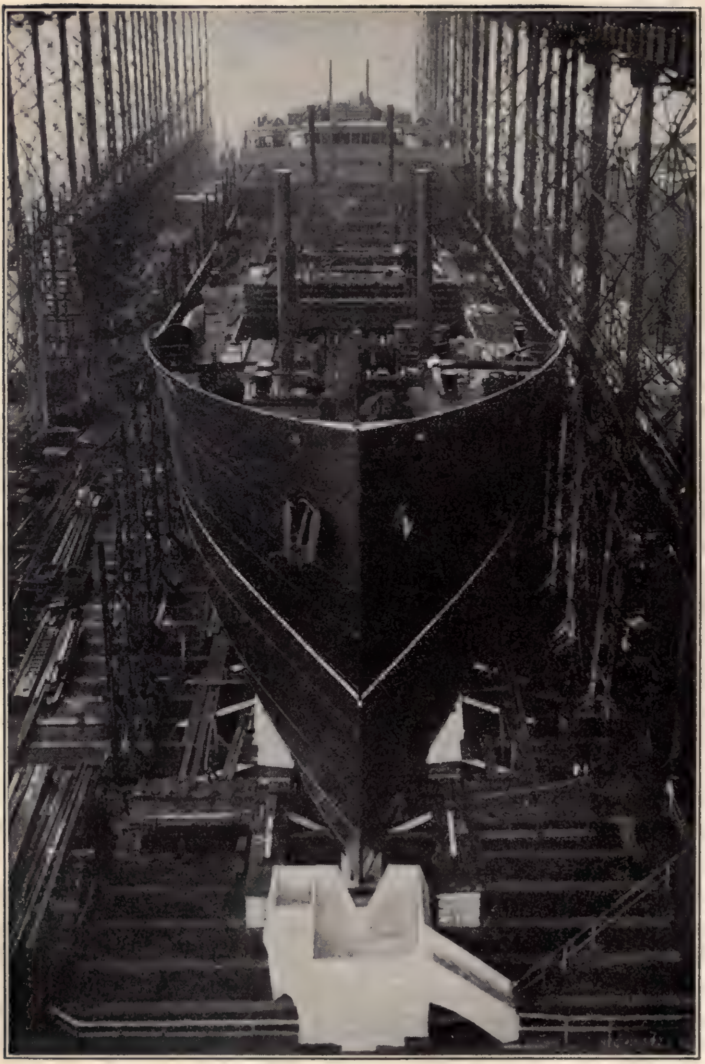
Hat factory, Philadelphia. The hats are made of felted rabbit fur. In this room the workmen are shaping the hats.

There are so many thousands engaged in shipbuilding that the Delaware River is sometimes called the American Clyde, after the famous shipbuilding center of Scotland. The finest of our merchant marine and the greatest of our men-of-war are built here. Philadelphia makes more railroad locomotives than any other city, and it has large numbers of people engaged in manufacturing other things of iron and steel, in the refining of petroleum and sugar, and in the manufacturing of leather. It has also a large chemical and dye-making industry.

As we proceed on our tour over the United States, we shall see more and more factories, and learn that our manufacturing industry is greater than that of any other nation. When our country was first settled, most of the people were farmers. As more came they began to make things to sell. This has gone on until now a very large part of our population is engaged in manufacturing. We have more than twelve times as many factories as we had forty years ago, and billions of dollars are earned every year by those who work in them. If we could see all the laboring people of the world, we should perceive that those of the United States are better fed, better clothed, and better housed than those of any other nation. This is especially true of Philadelphia. The people we meet are well dressed, and we walk for miles through long streets of neat little houses built of red brick, with steps of white marble. These are the homes of the working people, and it is said that more persons own their homes in Philadelphia than in any other city of its size.

Why has Philadelphia become a great manufacturing city?

One reason is because it is so situated that raw materials can be brought cheaply to it and its manufactured goods shipped cheaply to other parts of the United States. Some of the lowest passes through the Appalachian Highland can be reached from Philadelphia so that railways give the city an easy road to the lands farther west. It has several



Ocean liner, built in Philadelphia, almost ready for launching.

important trunk lines of railway. The Pennsylvania system, which has its headquarters here, controls so many iron tracks that if they were joined together they would reach halfway around the world.

Philadelphia is also a seaport, although it is almost one hundred miles from the Atlantic Ocean. Large vessels can sail up through Delaware Bay and on the Delaware River to Philadelphia, bringing the raw materials to the factories and carrying the goods made from them to all parts of the world. The Schuylkill (skōōl′kil) and Delaware rivers, which here come together, furnish Philadelphia with more than thirty miles of water front for docks and shipyards. They also give water power for manufacturing purposes, and the city lies so near the bituminous coal mines of Pennsylvania that the fuel for steam and electric power costs but little. Moreover, the only large beds of anthracite coal in America are situated not far away. This coal makes a great heat and is valuable for manufacturing. It is used largely also as a fuel to heat our homes. Anthracite is so hard that for a long time people did not think it would burn. But to-day many of us are protected from the cold of the winters by nothing else than anthracite coal.

Philadelphia was founded by the Quakers under William Penn, to whom the King of England had granted the tract which afterwards became the state of Pennsylvania. Philadelphia is sometimes called the Quaker City and also, as its name indicates, the "City of Brotherly Love." During most of the Revolution, and also from 1790 to 1800, it was the capital of the United States. It was here that the Continental Congress met, and here that our Constitution was drawn up.

We go to Independence Hall, where the Declaration of

Office buildings in the heart of Philadelphia. In the background is the tower of the City Hall.

Independence was adopted and the Constitution was framed, and where hangs the famous Liberty Bell, and then to Carpenter's Hall, where the first Continental Congress assembled. We visit the old Customhouse modeled after the Greek Parthenon, look at the home of Betsy Ross, who made the first United States flag of stars and stripes, and then walk about the City Hall, an enormous structure of granite and marble covering more than four acres. Upon its tall tower is one of the largest statues of the world. It is a bronze figure of William Penn, made by Philadelphia workmen. It does not seem large as seen from the ground; but it is really as tall as a three-story house, and the buttons on the coat are as large around as a tea plate.

During our tour of the city we linger a moment at the grave of Benjamin Franklin. It is in the yard of Christ Church, in the midst of the hum and hurry of the busy city, marked only by a plain marble slab. It was in Philadelphia that Benjamin Franklin lived the greater part of his life. He was born in Boston, and learned there the trade of a printer. He was only a boy when he came to Philadelphia to find work, and his first meal here was a loaf of bread which he bought and ate as he walked through the streets. He afterwards became a great man and was of much service to the United States.

When Franklin first came to Philadelphia, it was larger than New York, and it remained so until the Erie Canal was built. After that New York got ahead, but Philadelphia continued to be the second city of the United States for many years, and it is now surpassed in size only by New York and Chicago. It has almost two million people. As we look at its magnificent buildings we can hardly realize that the people lived in bark houses or caves while the first houses were building, less than three hundred years ago, and when we are told the enormous value of the land where the city now stands we think of the price at which the whole state was granted to William Penn. It was in payment of a debt of eighty thousand dollars due Admiral Penn, who was William Penn's father, for services rendered the king. The sum equals only about one third of a cent per acre.

We visit the mint, where most of our gold, silver, and copper money is coined. We have mints also in Denver and San Francisco, but the Philadelphia mint is the oldest, having been founded during the presidency of George Washington. The first coins made were copper cents. Coins of gold and silver were minted later, and last of all came the nickel.

The mint is situated in the heart of Philadelphia, not far from the City Hall. There are guards at the door, and visitors are carefully watched as they are taken from room to room and shown the processes of coining. The superintendent of the mint is our guide. He leads us down into the vaults, where the gold and silver bullion and coins are stored away. In one vault we see millions of silver dollars tied up in bags, and stacked against the wall like so much corn. In a smaller room are gold bricks piled up in regular order.

The superintendent asks us to lift one of the bricks, but our fingers slip off it as if it were glued to the floor. It is small and looks light, but it weighs forty pounds, or as much as a six-year-old boy. It is from such bricks that our gold money is made. We next enter a room where men are melting gold together with a little copper —9 pounds of gold to 1 of copper—in order that the coins may be harder and wear better. The pure gold we saw in the bricks is so soft that we could scratch it with our finger nails. The superintendent tells us that coins of pure gold would soon wear away, and that a wedding ring of pure gold would not last many years.

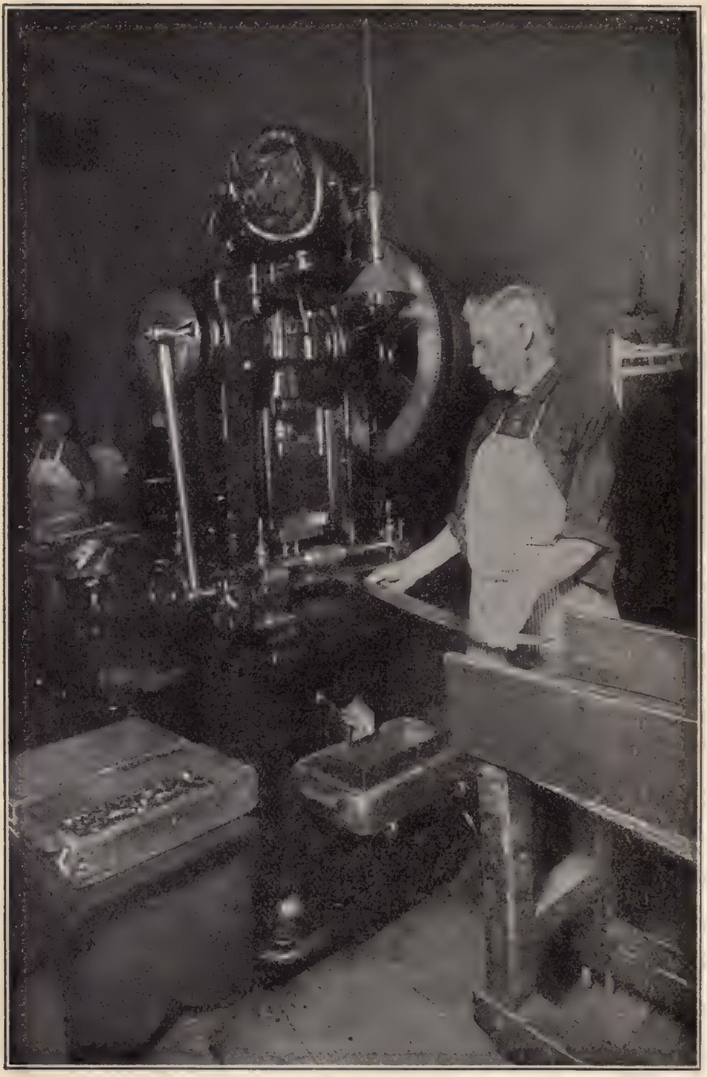
The melted gold is cast into strips or ingots about a foot long, two inches thick, and as wide as a twenty-dollar gold piece. It is from such ingots that the golden eagles, worth twenty dollars, are made.

As we go on into the silver-melting room we see how the metal for the silver dollars is cast into ingots of the same form, and follow the ingots to learn how they are made into dollars.

We soon find that our coins are not cast in molds, like bullets, as some of us had guessed; instead they are stamped out of the gold or silver metal. The silver ingots are rolled between cylinders of steel so graduated that the ingots grow longer and thinner as they are pulled back and forth, until at last they are just a little wider and about as thick as a silver dollar. The metal is now in long bands, and from these bands a vertical steel punch cuts out the blank or round pieces of silver of which the dollars are to be made.

It is important that every coin should have the right amount of silver in it, so each blank is automatically weighed before it is stamped. It is then taken down into the basement of the mint, and is shoveled with thousands of other blanks into a vat of acid, which eats off the dirt. It is now ready to go upstairs to be coined.

The coining is done in machines into which the blanks are fed through a long tube, so that the blank is dropped between two dies. The upper die bears the picture of the goddess of liberty, and the lower that of the American eagle. As the blank lies there, the two dies come together



Cutting out blanks for silver dollars.

upon it, exerting pressure so great that the pictures and letters are stamped on the coin.

Gold and copper coins are made in the same way. The total value of the gold pieces coined in the mints of the United States from 1792 to 1914 is more than three thousand million dollars, and that of the silver pieces is hundreds of millions. Shortly after we took possession of the Philippines, eighty-six million coins for those islands were made in this building.

Leaving the mint, we go to Franklin Field, the athletic grounds of the Pennsylvania University, to watch the boys play football, and thence to the Zoölogical Garden, which is free to school children. We visit Girard College, which was founded by a rich man for the education of poor orphan boys, and take a trip to Fairmount Park, one of the largest and finest city parks in the world, lying on both sides of the Schuylkill River. Then after a meal at the railroad station at Broad Street, we take the train for New York.

1. Locate Philadelphia. How far is it from the sea? On what rivers? In what state? Give its distance by railway from New York. From New Orleans. From San Francisco. (See table, page 498.) How far is it by railway from your home?

2. What advantages has Philadelphia as a seaport? As a manufacturing center? Ask your coal dealer where he buys his hard coal. Ask your railroad agent where the locomotives of his railroad are made.

3. Who was Benjamin Franklin? What famous experiment did he make with a kite?

4. When and how long was Philadelphia the capital of the United States? Who was President of the United States during part of that time? Name three great historic events that occurred here. Why is Philadelphia called the Quaker City? Why the city of Brotherly Love?

5. Why is not our gold coin made of pure gold? What is an ingot? A die?

6. Compare the Delaware River with the Clyde as to shipbuilding. (See Carpenter's "Europe.")

7. Who was William Penn? About what sum per acre did he pay for the state of Pennsylvania? At that rate, what would a six hundred acre farm cost? What is the cost per acre of farm land about your town?

X. NEW YORK AND SOME OF ITS WONDERS

IT takes us two hours to go from Philadelphia to New York. The distance is ninety-one miles. Our train takes us through Trenton, the capital of New Jersey, near where Washington crossed the Delaware to fight his great battle, and not far from Princeton, where he wrote his farewell address to the army. Trenton is famous for its pottery manufactures, making all kinds of wares from common china to fine porcelain. It has iron works, rubber factories, and wire mills that are the largest of their kind in the world.

Farther on the train stops at other industrial centers, including Newark on the Passaic River. Newark makes so many different things that it is sometimes called the Birmingham of America, in comparison with Birmingham, the famous manufacturing center of England. We see many smokestacks, and great factories of brick, iron, and glass as we go by. Paterson, the silk-making center, is not far away, and this whole region, which is only a few miles from New York, is humming with industry.

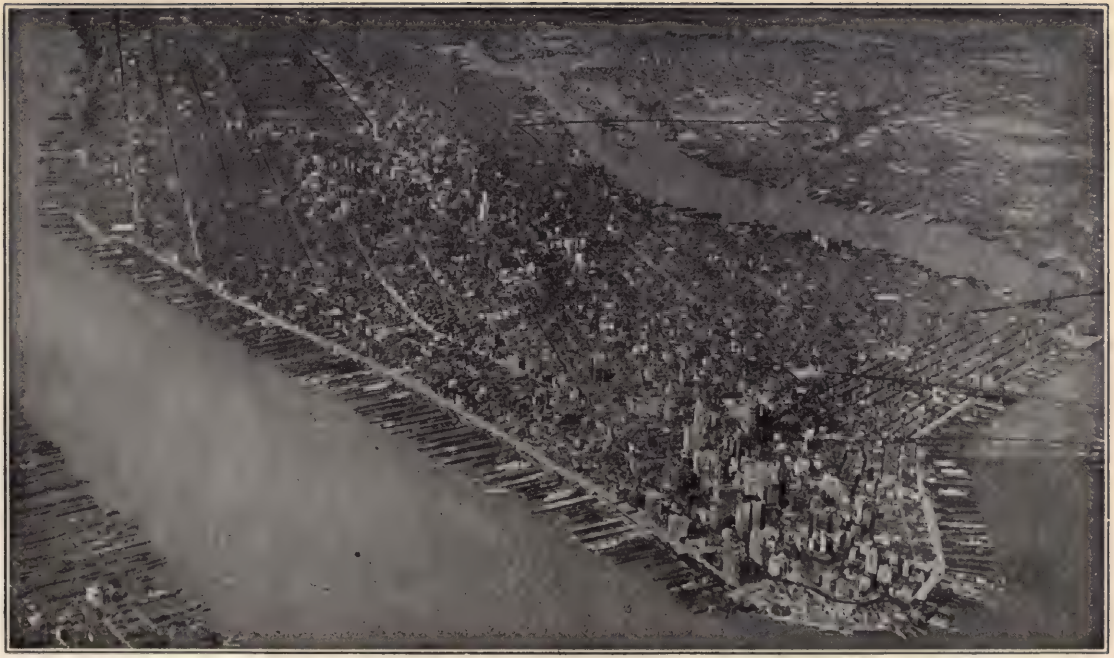
Our train stops a moment near the banks of the Hudson, and then shoots into a tunnel far under the bed of the river. It is now cooler. It is dark, and the lights are flashed on in the cars. Our ears ring as we ride through the compressed air of the tunnel, and the noise is like the rushing of a great wind. We pass lights here and there, and when we come out find ourselves in the Pennsylvania Railroad Station in one of the busiest parts of New York.

There are other tunnels in New York, and we might cross under the East River to Brooklyn or go underground to many other parts of the city. These tunnels are really steel tubes so encased with cement that the water cannot seep through. They are lighted and ventilated by electricity, and the cars are moved by the same motive power.

We are now in the largest city of the world. New York proper has about six million people, and the metropolitan district of New York, which includes also residences and manufacturing suburbs, contains about eight millions, exceeding the population of London. It has about one fourteenth of all the people of the United States. Indeed, it is difficult to realize how big New York is. It grows upon us at every step as we travel through it. We ask for a hotel, and hardly know which to choose when we are told that there are so many in New York that we could lodge in a different one every night for three years without going outside the city.

We learn also that New York has thousands of apartment houses, and that new ones are constantly being built. Four million New Yorkers live in apartments, ranging from the tenement houses in the poorer districts to the palace-like buildings in the fashionable residential sections.

More than a thousand passenger trains leave New York every day. The traffic of the city is so great that it requires roads both above and below ground, and, as we shall see farther on, elevated railroads, the cars of which fly through the air over steel tracks supported on posts. The business sections are so crowded with motor trucks, drays, carts, and automobiles that we have to ask a policeman to help



Part of Manhattan Island, New York, about 2 miles wide and 10 miles long, as seen from an airplane.

us from one side of the street to the other. The police are everywhere, and it takes more than ten thousand such men to keep order. They are dressed in blue uniforms with silver badges on the breasts of their coats. Many are stationed at the principal street crossings. Such an officer, with a motion of his hand to the drivers, will hold back the traffic on one of the intersecting streets while the traffic and the people are crossing it on the other street. Then he whistles and changes the signal to give the right of way again to the traffic on the first street.

At first we determine to see the whole city, but find it has so many streets that if we should walk ten miles every day we could not go through them all in one year, and we give up that plan in despair.

Before we go on, let us consider just where New York is; for it is its situation that has made it so great. The city is located about midway on the coast line of our eastern states, which are the busiest part of our country. It is about three thousand miles from Europe; and it has one of the largest and best harbors of the world. The oldest and most important part of the city is on the island of Manhattan at the mouth of the Hudson River, and other parts include the Bronx on the mainland to the north, Staten Island, and the boroughs of Queens and Brooklyn on Long Island, all of which have a water front on the rivers or on New York Bay.

From this harbor run the easiest routes from the Atlantic Ocean to the parts of the United States where most of the people live. Several railroads and motor-truck lines make their way through the Hudson and Mohawk valleys, where the pass over the Appalachian Highland is so low that freight has to be lifted much less than upon the passes farther south. Therefore the cars going through these valleys can carry goods more cheaply to the interior of our country than those from other seaports.

Moreover, New York is connected with the Great Lakes by the Hudson River and the New York Barge Canal, so that the vast farming and manufacturing regions lying about and beyond those lakes can send their products by water to New York for shipment to Europe, and by the same route have cheap goods in return. This, however, is of little importance in comparison with the advantages of low passes for the railways, which carry most of the traffic.

The anthracite coal mines are only one hundred miles to the west, and bituminous coal comes in cheaply by rail and by sea. Thus fuel as well as the raw materials for the factories can be brought here at small cost, and goods can be shipped almost anywhere at a low rate.

The island of Manhattan is not more than fourteen miles long. It is so narrow that we can walk from one side of it to the other at almost any point in half an hour. We shall begin to explore at the lower part of the island. The ground here is covered with buildings so high that as we look up they seem almost to touch the sky. They wall the sidewalks so that the streets look like canyons. One of them exceeds by almost one third the height of the Washington monument. The land here is so valuable that the people seem to build almost to the heavens to utilize every square foot. It is worth so much that all the gold mines of the globe could not in ten years produce enough money to buy it.

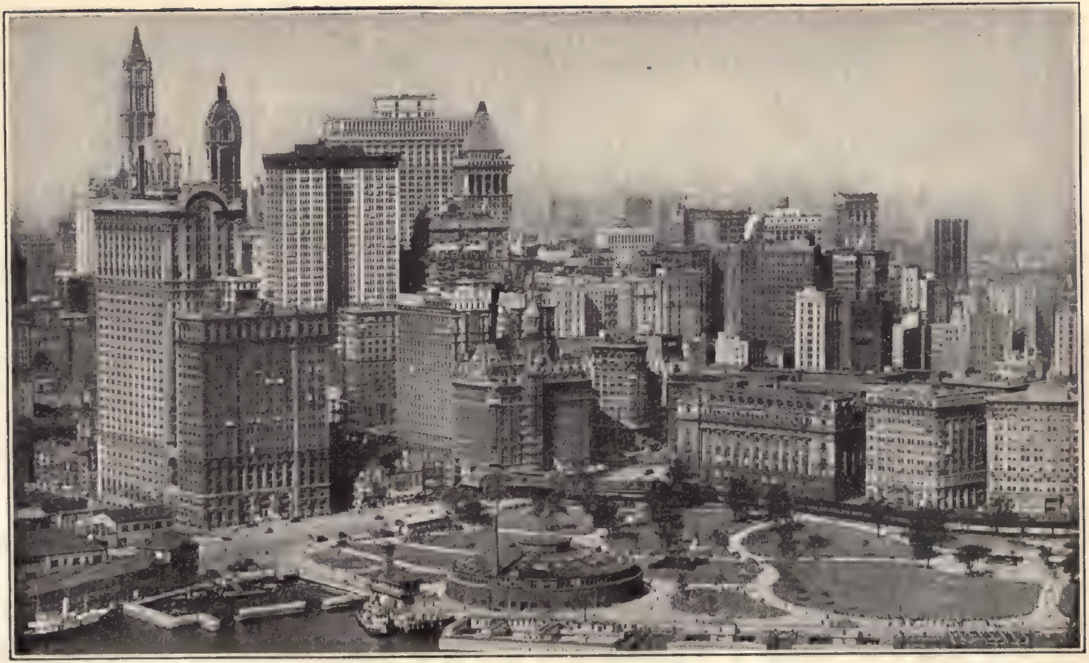
When our forefathers came, Manhattan Island belonged to the Indians. What do you think the Indians got for it?

They sold it for goods worth twenty-four dollars. The island contains twenty-two thousand acres, and at that rate the white men paid for each acre only about one tenth of a cent. It was rocky and covered with forests. The Indians did not think it of any value. They had never heard of such a thing as a seaport, and the land was hard to get at with their little canoes. They did not know what money meant, and they took their pay in ribbons, beads, and other small trinkets. The men who bought the island belonged to a small group of people from Holland. They built a little town on the lower end of it and named it New Amsterdam, after their famous city Amsterdam. The place was so called as long as it was controlled by the Dutch, but a little later, when it was taken by the English, it was renamed New York.

The little settlement grew rapidly. It was already the second city of the United States when the Declaration of Independence was signed, and soon after the Erie Canal was opened it surpassed Philadelphia and became the chief American city. There is no doubt that it will continue to grow, and that it will always hold its own as the greatest city of the world.

We spend some time on Broadway, the chief business street of lower New York, and the main artery into which the other streets flow. How lively it is and how noisy! Every one is on the rush, and as we join the hurrying crowd we are jostled and pushed this way and that. The sidewalks are black with men, women, and children moving along, paying little attention to any one but themselves. The roadways are blocked with motor trucks and other vehicles. There are frequent jams, and the drivers often scold one another. There are car lines running through the streets, and stations by which we can go down into the subways at every few blocks.

Now and then we stop and look up. The buildings are



Lower end of Manhattan Island, showing great office buildings. In the foreground is Battery Park.

so tall we could not shoot an arrow as high as their roofs. Some of them have forty or more stories; one has forty acres of floor space and its elevator shafts if placed end to end would reach to a height of two miles. Another office building has one thousand windows, and some of the great hotels have more than two thousand rooms.

These great office structures are furnished like palaces. We walk through them over floors of marble and fly on elevators from story to story. Some have post offices in them. Others have stores of many kinds on the ground floor, and many have restaurants in the top story, where we eat our lunch high above the spires of the tallest church steeples. Indeed, one could live in one of these large buildings and have all his wants supplied without going out.

Everything is business in this part of New York. On all sides of us are great wholesale establishments and there are retail stores everywhere. The retail drygoods business alone includes two thousand stores, employing more than one hundred and fifty thousand people. There are factories on almost every block and as we go through the side streets we observe that thousands are working in cellars making many kinds of goods under the ground.

We walk up Broadway past City Hall Park, and then turn and go back a few blocks down the street to Trinity Church, one of the oldest and most interesting buildings of the United States. It is made of brownstone, and there is a large churchyard about it, in which are the graves of some famous Americans of the past. The yard is filled with flowers and trees, and it seems strangely peaceful in contrast with the pushing throng on Broadway.

We enter, and stand for a moment by the tomb of Robert Fulton, who made the *Clermont*, the first steamboat that sailed on the Hudson River. Its trial trip from

New York to Albany was made in 1807, and that voyage proved that steamboats would be profitable. Therefore, we may call Robert Fulton the father of the thousands of steamships which come to New York every year. Near Robert Fulton lies Captain James Lawrence, the hero of the frigate *Chesapeake*, and the author of the saying, "Don't give up the ship"; and at the lower end of the yard, near the fence, we see a white marble monument under which are the remains of Alexander Hamilton, one of the founders of our government, who was shot by Aaron Burr in a duel.

Leaving the churchyard and crossing Broadway, we take a walk through the Wall Street section, where are the offices of the men who own or direct much of the wealth of our country.

Wall Street is often called the money capital of the United States. Its daily transactions amount to many millions of dollars and its yearly exchanges are reckoned in billions. The sums are so vast we cannot comprehend them. On Broad Street, near Wall, is the Stock Exchange, where stocks and bonds to the amount of billions of dollars are bought and sold annually. By stocks are meant shares in different business enterprises such as railroads, steamships, telegraphs and telephones, as well as in all our great business and manufacturing industries. The prices of such shares sometimes change quickly, and men make and lose fortunes in buying and selling them. It is in the Stock Exchange that such work is done.

We are admitted to the gallery of the building and look down. In the great room below us are hundreds of well-dressed men, some with hats on and some without, running to and fro, pulling and yelling at one another. They are the bankers and brokers who are the members of the exchange. It costs each of them tens of thousands of dollars for the privilege of buying and selling there. Each has a little notebook in one hand and a pencil in the other, and with these he jots down his purchases and sales. Telegraph boys rush in and out through the crowd, and the sight makes us think of a crowd of crazy people rather than of sensible men.

Near by is the Produce Exchange, where grain of all kinds is bought and sold. New York is one of the chief grain markets of the world, and in this exchange wheat, corn, and oats are sold not by the single bushel, but by the thousands of bushels. The smallest amount one can buy or sell is five thousand bushels, and millions of bushels are often bought in one day. We next visit the Cotton Exchange, where men trade in cotton in large quantities. and our heads fairly swim as we try to understand the vast sums involved in one day's business of this financial center.

We are anxious to get out of the bustle, and we walk down a side street to rest our eyes and ears before taking taxicabs to the hotel uptown where we shall stay over night.

XI. OUR FOREIGN COMMERCE

THE largest hotels of New York are several miles above the place where Wall Street runs into Broadway. That in which we stay is not far from the Pennsylvania Station, and when we start out in the morning we are in the heart of one of the great shopping districts. Broadway here is almost as busy as down at Trinity Church, and Fifth and Sixth avenues and the side streets leading to them are so lined with store windows that as we walk along we seem to be going through a huge museum walled with glass cases.

Goods of all kinds are spread out before us, and we see that every nation of the world has sent its products to New York for sale. Those bright-colored silks over there came from China. They were woven on rude looms by yellow-skinned, slant-eyed men and women upon the banks of the Yangtze River. They were brought to America on a steamship through the Indian Ocean, the Red Sea, and the Suez Canal. They crossed the Mediterranean, passed through the Strait of Gibraltar, and thence came to New York. Those rich velvets and laces were brought across the Atlantic Ocean from Europe; and those diamonds you see in that jewelry store were dug by black-skinned, half-naked men in the mines of South Africa.

Here is a tea store supplied by the bushes of the Himalaya Mountains in northern India and by the tea gardens of Japan and China. Next to it is a shop where one can buy coffee from Brazil and sugar from Cuba. That toy store has many French dolls and curious mechanical playthings made in the mountains of Germany; and the tiger-skin rug in the window next door once covered the body of a beast that prowled through the jungles of northern Hindustan. There are other things all about us from every part of the world, and we resolve to go to the wharves and see the great ships which bring these goods into our country.

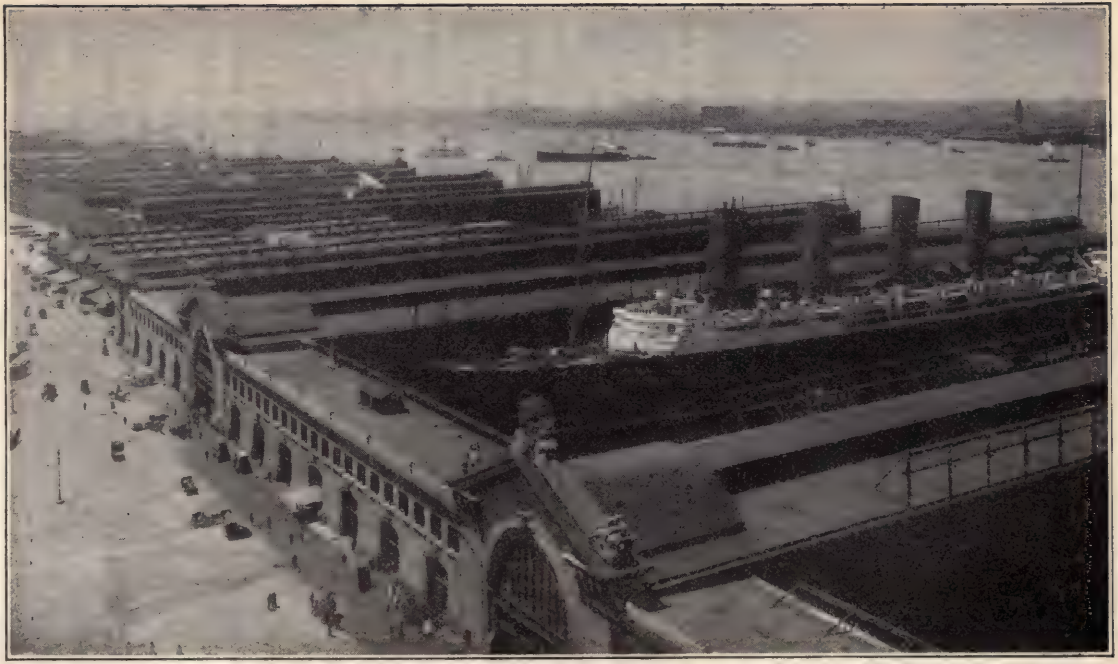
Let us first take a ride to the lower part of the island. New York is so crowded that the surface electric cars require a long time to make their way from one end of it to the other. For this reason subways have been dug under the streets, and elevated railroads have been built high above the roadways. All the lines are double-tracked.

Indeed, the subways for long distances have four tracks, and the elevated railroads three tracks, so that they carry both local trains and express trains. The cars go almost as rapidly as on an ordinary railway. The elevated tracks are supported by steel columns which extend to the height of the second or third story windows.

We have to walk upstairs to get to the train, and we find ticket offices and news stands on the elevated platforms. Our tickets cost us five cents apiece. We drop them into the box at the door of the station, and rush for the cars. As we step aboard, the guard closes the iron gates at the side of the car platform, and the train begins to move. The car windows are like those of a street car, and we can see into the upper stories of the houses as we ride through the air. Here women are washing clothes, there they are cooking; here we go by a shop where tailors are working, and there pass buildings given up to other manufacturing.

New York has more factories than any other city of our country. It has a million people who make things to sell, and the different kinds of industries are more than one thousand. The manufacturing plants number twenty-five thousand. The capital used is over one billion dollars, and if every man, woman, and child in the United States should put twelve dollars into one pile, it would not be enough to buy the goods which New York turns out in one year. The city makes one fourth of all the jewelry, one half of all the clothing, one fifth of all the paint, and all together about one tenth of all the manufactured goods produced in the United States in one year.

Here we are at the wharves. What a crush and jam there is all about us! The streets are crowded with wagons and motor trucks loaded with goods on their way to the ships. We walk past great piers upon which are long, roomy



The wharves of lower Manhattan. At the right is a giant ocean liner just in from Europe.

sheds filled with bales, boxes, and barrels, where scores of men are at work loading and unloading vessels.

Manhattan alone has over fifty miles of water front, and there is as much more space for wharves and landing places on the Long Island and New Jersey shores. More than half of all that we buy of foreign nations and about two fifths of all we sell to them, pass through the port of New York.

Our imports, with the exception of silk, rubber, hides, wool and certain other fibers, and a few things that cannot well be raised in America, consist almost altogether of manufactured articles. We are the chief manufacturing nation of the world, but our factories are not numerous enough to supply all our needs, and so we import much from other countries. The amount of money we spend in this way is so great that if it were equally divided every man, woman, and child of us would get ten dollars' worth each year, and there would be many millions to spare.

Moreover, we sell to other countries goods worth about as much as the merchandise we buy of them, so that it takes a great fleet of vessels to carry our goods abroad and to bring foreign goods back to us. Over three thousand steamships annually come from foreign countries to the wharves of New York, and there are in addition thousands of sailing vessels. A procession of steamers is always moving back and forth across the Atlantic Ocean carrying our wares to the people of Europe and bringing their wares to us.

A large part of all we sell abroad is produced on our farms. We raise so much more than we can use that the United States has become a great country store for the European nations. Every year hundreds of ships laden with grain sail out of New York. The steamers have their holds filled with grain in bulk, and between the decks the wheat is piled up in bags. Such vessels are loaded quickly, half a million bushels of grain being often packed away in a ship in one hour. Great quantities of meat and other provisions are sent abroad every week, and live cattle also are carried across the Atlantic to be killed there for the markets.

The people of most other countries send to our great store for a part of the oil which they use in their lamps. Our petroleum is shipped from New York, Baltimore, Philadelphia, and other places in tank steamers, a single one of which will hold thirty thousand barrels of oil. The steamer is divided into a half-dozen or more huge tanks. The oil is pumped into the tanks, and it remains there in bulk until it is again pumped out upon the wharves of the great ports of Europe, Asia, and Africa.

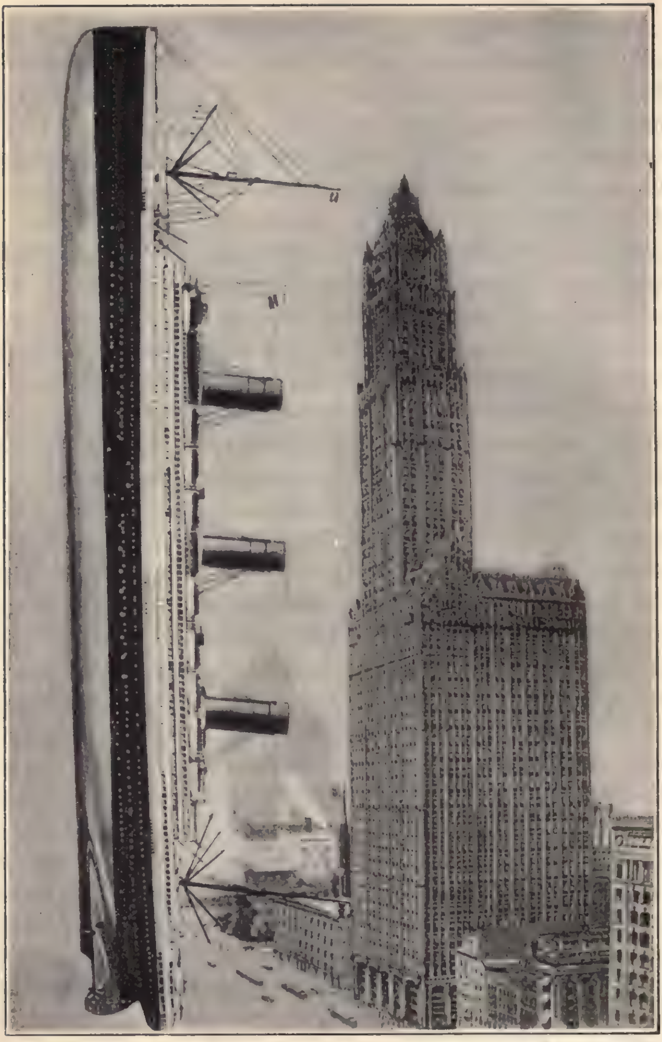
It is in vessels of the same kind that molasses is brought to the United States from Cuba. Think of the biggest house you have ever seen as one solid box, and let it be filled with molasses, and you may get some idea of the sweetness that, protected only by a thin sheet of steel, is thus carried through the salt waters of the ocean.

While at the wharves we visit ships loaded with cotton. This comes from the plantations of our southern states and is carried in bales to Europe and Asia to be made into cloth. We get more than twice as much every year from the raw cotton we sell to other countries as from our sales of wheat and flour. Cotton is, in fact, one of the most valuable of all the articles that the rest of the world buys from our store. We sell more than half of all we produce, and sometimes get as much as eight hundred million dollars for our foreign exports of cotton. We sell also great quantities of manufactures of various kinds, and such exports increase every year.

Our chief trade is with Europe, but we are sending more and more to Asia, South America, Australia, and Africa, and to our cousins of the Hawaiian and Philippine Islands. The English are our best customers. They buy a vast deal of our raw cotton, breadstuffs, and meats, for which they pay several times as much as we pay for the manufactured articles they sell to us.

The fastest steamers of the world come from England to New York. Some vessels now cross the Atlantic in less than five days, traveling so swiftly that they have been called ocean greyhounds. We visit one of these steamers, the *Berengaria*, which has just come from Liverpool. It is a great floating house of a half-dozen stories, so long that it would reach the length of two average city blocks, filling the street and extending high over most of the houses. If stood upon end it would reach above the top of the tallest building of New York, which is over seven hundred and fifty feet high (page 88). The ship has large dining rooms, sitting rooms, bedrooms, and bathrooms, and we see that people can now live quite as well upon the water as upon the land. We look at the enormous engines, as strong as fifty thousand horses, which drive the huge ship through the water, and are surprised when told that its furnaces eat every day as much coal as would heat fifty large dwelling houses for a whole year.

Away down in the lower part of the ship we find some large rooms not so well furnished. This is the steerage. It is full of immigrants who have come across the Atlantic from Europe. Such people are not landed at this wharf. They will be carried to Ellis Island, in the harbor, where the officers of the Immigration Bureau will examine each one to know whether he is likely to make a good citizen of the United States. We are glad to have people from all



The length of the Berengaria as compared with New York's tallest building, which is over 750 feet high.

parts of the world to settle in our country and aid in developing it; but we do not wish any who are diseased or unable to work and hence likely to go into the poorhouses to live. Therefore our government has provided that all immigrants coming to this country must be examined before they can land. If they have no money at all, or are idiots, insane, or diseased, or have been convicted of stealing or certain other crimes, they are sent back to the countries whence they came.

For years the poor people from all parts of Europe have been coming to America, because they can make more money and live better here than at home. Since 1820 it is estimated that about thirty-three million immigrants have arrived on our shores, and now nearly half of our inhabitants were either born in other countries or are the children of people born there. Many of the immigrants stay in New York. It has more Jews than any other city in the world. It has more Irish than any city in Ireland. It has hundreds of thousands of Germans and Italians and people from Russia.

We visit Ellis Island, where these immigrants land. Here we find ourselves surrounded by hundreds of odd-looking men, women, and children. Very few of the women wear hats, and the men have caps or queerly shaped hats. There are many English and Irish, and a large number of Germans. There are dark-faced Italians, and long-bearded Jews from Russia and Poland. There are fair-skinned people from Norway and Sweden, and sturdy boys and girls from Holland, some of whom wear wooden shoes. Everybody has his baggage with him, and some sit on piles of bedding which they have brought from their homes. They seem strangely out of place; but as we look at them we realize that they are strong and able to work, and that they may make good American citizens.

A family of Dutch immigrants arriving at Ellis Island.

We take a boat and sail over to Bedloes Island to see the statue of Liberty Enlightening the World. It is as high as a tall church steeple. We get some idea of its size when we learn that forty men have stood inside its head at one time, and that its forefinger is so long that it would reach from the floor to the ceiling of an average room, and so big around that the hoop of a flour barrel would just about fit it if used as a ring.

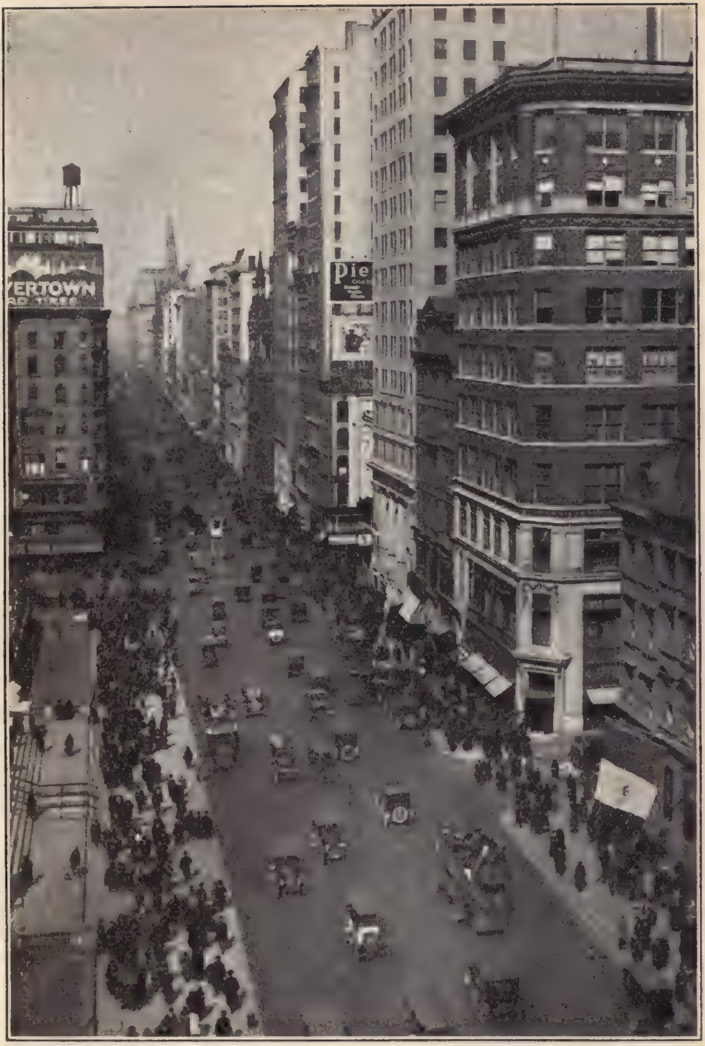
The statue of Liberty, seen from Ellis Island.

As we leave the statue and go back to Manhattan we have a fine view of the Brooklyn Bridge, the oldest of the bridges which unite Brooklyn with Manhattan Island. (This bridge is in the foreground on page 74.) It is an immense structure of stone and steel, more than a mile long, crossing the East River. It cost more than the Capitol at Washington. Connecting Manhattan with Long Island and with the mainland are many other bridges, upon which have been spent all together about one hundred million dollars. In addition there are sixteen great tubes under the rivers, so travel is made easy between the different parts of the city. There is also a steel-arch bridge which connects the city with a great trunk line to New England, and the trains of the Pennsylvania Railroad can now go from Washington to Boston without transferring the cars or the passengers. This bridge carries four railroad tracks and is the heaviest and longest arch in the world; it cost about fifteen million dollars.

During our stay in New York we ride up Fifth Avenue on the top of a motor bus. This takes us through the great retail shopping center, and past mile after mile of magnificent stores. The way is thronged with automobiles, two continuous streams, each two or three cars wide, flowing on the two sides of the street.

We take motor cars to see some of the many other wonders of the city. We visit the Public Library, which has more than two million volumes, and fine collections of paintings and prints. We spend some time in the Metropolitan Museum of Art, where are many of the great paintings, statues, and other examples of art in the United States; and in the American Museum of Natural History we find wonderful collections of stuffed animals and birds, insects, minerals, and other things from all parts of the world. We ride up Riverside Drive, and see the tomb of General Grant overlooking the Hudson.

Some of our evenings are spent at the theaters, of which New York has several scores, or in visiting the great moving picture houses, which are attended by hundreds of thou-



Fifth Avenue in front of the Public Library. Traffic is controlled by colored lights in the little tower in the middle of the avenue.

sands of people every night. We are interested also in the churches, of which there are so many that one could go to two different churches every Sunday throughout the year and then not visit them all. They represent almost every religion, and among them are the largest churches in the United States, namely, Saint Patrick's Cathedral and the Cathedral of St. John the Divine.

We spend a great deal of time in Central Park. We watch the boys and girls of New York at play, and take a ride in the boats on the lake. We look at the Obelisk from far-away Egypt and photograph some of the many statues, including those of Shakespeare, Robert Burns, and Sir Walter Scott.

At Bronx Park we visit the Zoölogical Garden, one of the largest in the world, where there are hundreds of animals, birds, and reptiles. We walk about through the Botanical Gardens, where are growing thousands of different kinds of trees and shrubs and flowers.

At the old Polo Grounds in Manhattan, many world-championship baseball games have been played. In Brooklyn there is another great baseball field, and the beautiful Prospect Park; but we have not time to visit them now. We go back to our hotel to spend the night and then take taxicabs for the Grand Central Railway Station, where a train drawn by two electric locomotives is ready to start for New England.

1. Locate New York. How far is it from San Francisco? From New Orleans? From Boston? From Chicago? What is the distance from New York to Cape Town? (See table, page 496.) To Colon, on the Panama Canal? To Port Said, on the Suez Canal? To Liverpool? To Yokohama? Take a trip to each of these places, showing the route you would travel. At fifteen miles per hour by ship how long would you be on the way?

2. Start at your home and make a trip to New York. What rail-

ways do you take? Through what important cities do you pass? At thirty miles per hour, how long would your trip take?

3. What is the population of your home locality? How many such places would equal New York? Compare New York in size with London, and with the three other largest cities of Europe. With the two largest cities of South America. With ten of the largest cities of the United States, giving the distances of each from New York. With the two largest cities of Asia.

4. What advantages has New York as a commercial center? By its sea routes? By its land routes? What valley makes it the easiest gateway to the interior of the United States?

5. Why has New York become our largest manufacturing city? What proportion of our manufactures does it make? Ask one of your merchants how many kinds of goods he gets from New York.

6. Trace a shipment of raw silk from Yokohama to New York. Of tea from Shanghai. Of coffee from Rio de Janeiro. Of wool from Melbourne, Australia. Of sugar from Havana, Cuba.

7. Who founded New York? What price was paid the Indians for the land? What was the first name of the city?

8. Why do so many of our immigrants come to New York? Is it a good thing for our country to have immigrants? From what land did your forefathers come?

9. How high is the house in which you live? How many such buildings, one on top of another, would equal the height of the tallest building in New York?

10. Describe your visit to the city, mentioning the things which have been most interesting to you.

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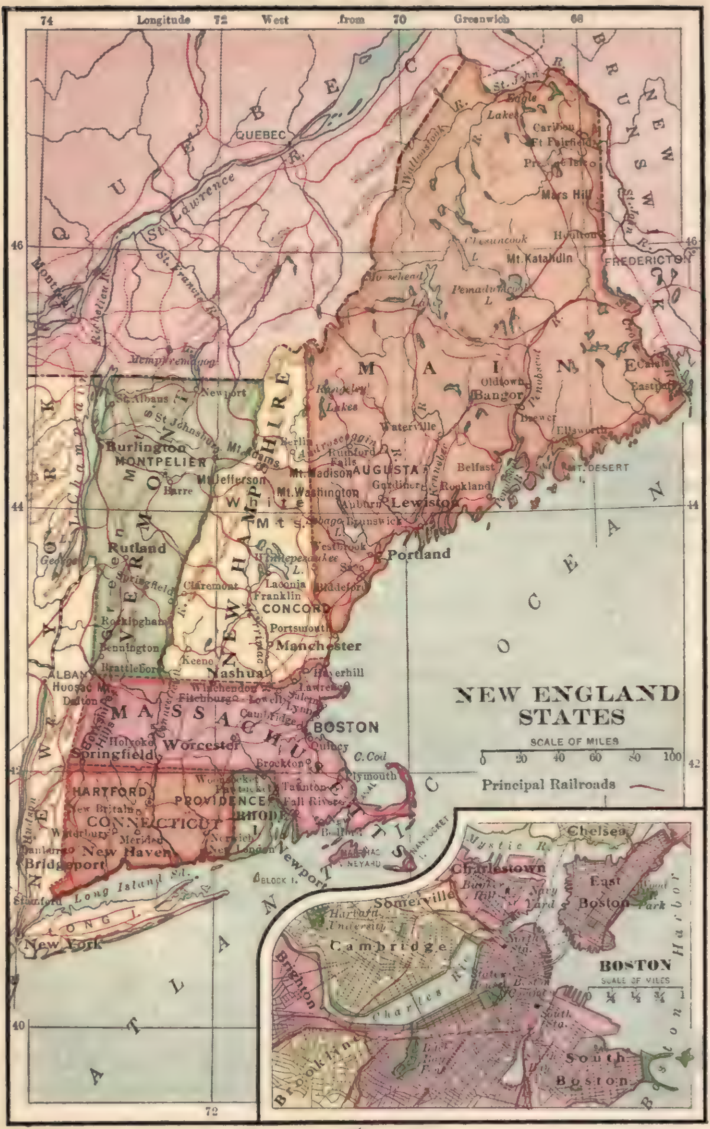
XII. NEW ENGLAND—COMMERCE AND MANUFACTURES

NEW England is the name often used for the northeastern portion of the United States, comprising Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut, six of the smaller states of our


NEW ENGLAND STATES
SCALE OF MILES
0 20 40 60 80 100
Principal Railroads
Longitude 72 West from 70 Greenwich
74
68
46
44
42
40
72
QUEBEC
NEW BRUNSWICK
St. Lawrence
QUEBEC
Montreal
St. Francis R.
Richelieu R.
Memphremagog
St. John R.
Eagle Lakes
Caribou
Ft Fairfield
Presque Isle
Mars Hill
Houlton
Allagash
Chesuncook L.
Mt. Katahdin
Moosehead Lake
Pemadumcook L.
FREDERICTON
St. John R.
St. Croix R.
MAINE
Calais
Eastport
Oldtown
Bangor
Penobscot R.
Brewer
Ellsworth
Rangeley Lakes
Waterville
Androscoggin R.
Rumford Falls
AUGUSTA
Kennebec R.
Belfast
Gardiner
Rockland
MT. DESERT I.
Lewiston
Auburn
Brunswick
Sebago L.
Westbrook
Portland
Saco
Biddeford
VERMONT
St. Albans
Newport
St. Johnsbury
Burlington
MONTPELIER
Barre
Green Mts.
Rutland
Springfield
Rockingham
Bennington
Brattleboro
L. Champlain
L. George
NEW HAMPSHIRE
Berlin
Mt. Adams
Mt. Madison
Mt. Jefferson
Mt. Washington
White Mts.
Winnepesaukee L.
Claremont
Laconia
Franklin
CONCORD
Portsmouth
Manchester
Keene
Nashua
Merrimac R.
Connecticut R.
NEW YORK
ALBANY
Hudson R.
MASSACHUSETTS
Hoosac Mt.
Dalton
Berkshire Hills
Winchendon
Fitchburg
Lowell
Haverhill
Lawrence
Salem
Lynn
Cambridge
BOSTON
Quincy
Holyoke
Springfield
Worcester
Brockton
C. Cod
Plymouth
Taunton
Fall River
New Bedford
CANAL
NANTUCKET I.
MARTHAS VINEYARD
CONNECTICUT
HARTFORD
New Britain
Waterbury
Meriden
Danbury
New Haven
Bridgeport
Norwich
New London
Stamford
Woonsocket
Pawtucket
PROVIDENCE
RHODE I.
Newport
BLOCK I.
Long Island Sd.
LONG I.
New York
ATLANTIC OCEAN
BOSTON
SCALE OF MILES
0 1/4 1/2 3/4 1
Chelsea
Mystic R.
Charlestown
Bunker Hill
Navy Yard
East Boston
Wood Is. Park
Somerville
Harvard University
Cambridge
North Sta.
Charles R.
State House
Boston Common
South Sta.
Brighton
Back Bay F.
Brookline
South Boston
Boston Harbor

Union. All together it contains only about sixty-seven thousand square miles. It is not so big as Missouri, and is less than one fourth as large as Texas.

The shores of New England were visited by John Cabot and other explorers not long after Columbus found the New World. Captain John Smith sailed along them, made a rough map of the coast in 1614, and named the region New England. Before that it had been called North Virginia.

The soil of New England is such that many of its people can make more money in other ways than by farming. A large part of the land is mountains. The Appalachian Highlands extend through it, and the only very fertile spots are to be found in the valleys of the rivers, and in the narrow strip of Atlantic plain which runs along the coast. Much of Maine is covered with forests and lakes, and some of the land in other New England states is so stony that it can be used only for the rearing of cattle and sheep. More than half the food consumed in this part of our country comes from the Mississippi valley. The New England winters are long and cold, and the ground is often covered with snow for months at a time.

One might think that this would be one of the poorest parts of the United States, that few people could live there, and that those who manage to exist would have very little wealth indeed. But the truth is that New England has very great wealth and the southern portion of it is the most thickly settled part of our country. There is no other state with so many inhabitants in proportion to its size as Rhode Island. Connecticut and Massachusetts have hundreds of cities and villages. There are few other places in the world where men live so well. The New Englanders have more wealth than the people of any

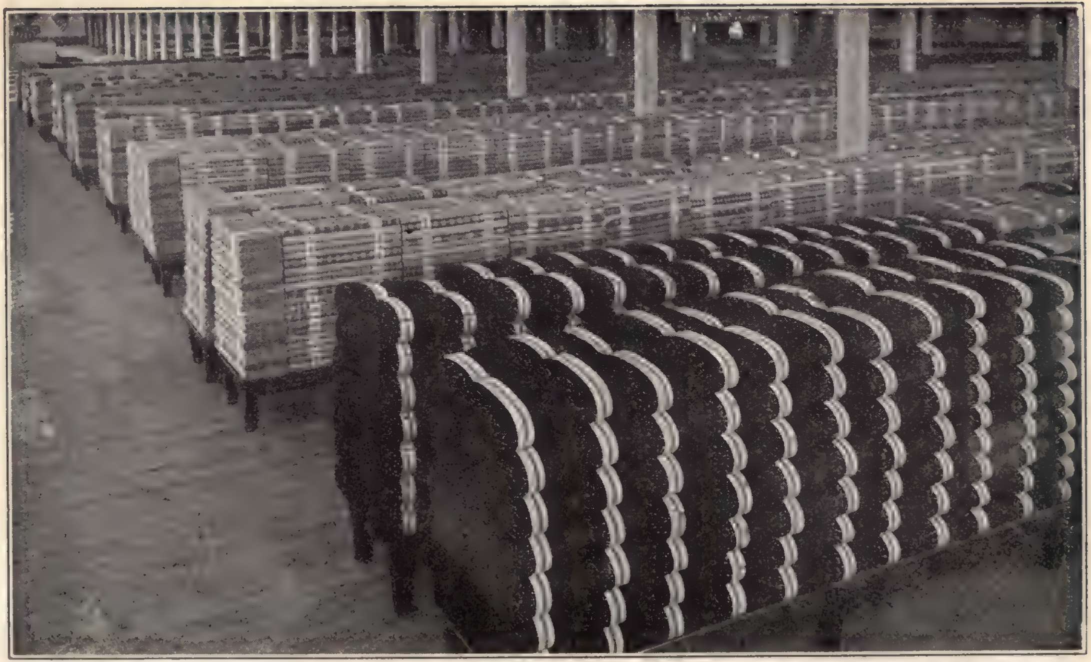
Dam at Lawrence, Mass. The water power here drives more than one million spindles and looms.

other section of the same size in the United States; and Massachusetts alone has enough to buy some of the western states that are ten times its size.

How does this come to pass? New England has only three small navigable rivers, although it has many good harbors giving all parts of it easy access to the sea. It has no gold, silver, or iron mines, and no large coal fields like Pennsylvania. The secret lies partly in the large number and peculiar character of the New England rivers. Each has a nearly constant flow of water, a rapid fall, and a narrow valley, conditions which make its water power easily available. Since they began to flow, the land has sunk a little, and allowed the sea to invade their mouths, so that each stream flows into a deep tidal inlet which makes a good harbor. To this must be added the position of New England directly opposite the shores of Europe, and nearer to them than any other part of the United States. The sturdy, enterprising, and thrifty people who settled New England were not slow to avail themselves of these ideal conditions for manufacture and commerce.

Water power is the cheapest of all powers. It is used to generate electricity, and a great part of our manufacturing is done by it. One little stream will often do the work of a hundred horses. Indeed, it is estimated that we have so much water power in our country that if we used the whole of it, it would be stronger than several hundred million horses all pulling at once.

The New England states have rivers and streams which might furnish a half million horsepower, and it has a large part of this water power already at work. To do one horsepower of work for one year by a steam engine requires about ten tons of coal, so that the half million horsepower, which New England might generate by water, is equal to



Cotton cloth ready for shipment from a Manchester mill. This is the product of only one day's weaving.

five million tons of coal every year. New England has no black coal, but this white coal comes from a mine that will never give out. It is like the magic pitcher of the fairy tale. You may drink the contents, but the pitcher fills up as fast as you can swallow.

When the people of New England learned that it was hard to get a living from the soil, they began to manufacture and soon found they could earn more money in that way than by farming. They became so skillful that they could make goods cheaply and well. As our country grew they built more and more factories. They began to use their waterfalls and they found also that they could bring in coal from Pennsylvania at low cost, so that now in most parts of New England there are factories operated by steam, in addition to those run by water.

It is wonderful how many things come from New England. Nearly every one of us has now in use one or more of its products. Many kinds of cotton goods are made here, and we may visit huge mills which are weaving ginghams, muslins, calicoes, and other dress goods from the raw cotton of our southern states. In other places mills are making sheets, towels, and handkerchiefs, as well as yarn and thread and underwear of various kinds. The cotton is brought in great bales of five hundred pounds each upon ships from Galveston, New Orleans, and other parts of the South. By machinery it is spun into thread and woven into cloth.

The power of the Merrimac, the Connecticut, and other rivers applied to such weaving and other manufacturing has built up many cities, such as Nashua and Manchester in New Hampshire; Fall River, New Bedford, Lowell, and Lawrence in Massachusetts; and Pawtucket and Providence in Rhode Island. These cities are devoted largely to making cottons. Manchester weaves sixty miles of cloth an hour, five hundred miles a day, and about one hundred and fifty thousand miles in one year. This would be enough to carpet a wide road running clear around the world at the equator. Fall River and New Bedford, in Massachusetts, weave more cotton cloth than any other places in the United States. There are more than three million spindles in the New Bedford mills, and more than four million in the Fall River mills. Fall River has thirty-five thousand workers in its cotton mills.

There are also many cotton mills in the South, and huge factories are now working close to the plantations on which the cotton is grown.

More than half of the woolens of the United States are made in New England, and those annually woven in Massachusetts alone would equal a strip a yard wide and long enough to go more than two and one half times around the world at the equator. Some of the largest mills are at Lawrence on the Merrimac River. The first woolen mill of America was started in Hartford, Connecticut, and when George Washington was inaugurated President he wore a suit made of cloth woven in that mill.

So many of our boots and shoes are manufactured in Massachusetts that tens of millions of our people may be said to have a part of that state under their feet. Two out of every five Americans are shod with Massachusetts leather. The city of Brockton is famous for men's shoes, Lynn for women's shoes, and Haverhill (hā′ ver-ĭl) for slippers. Brockton makes twenty million pairs of shoes in one year. Most of our army shoes for the World War were made in New England, where one single factory turned out fifty thousand pairs in one day.

Connecticut not only tells us when to get up in the morning, for it makes most of our clocks, but it also helps us to dress, for its factories produce tons of buttons, millions upon millions of hooks and eyes, and most of the pins that fasten our clothes. Waterbury in that state is the center of our brass goods industries, and Meriden is called the silver city because it makes plated ware. Providence, Rhode Island, has two hundred jewelry factories, and Winchenden, Massachusetts, is called the Toy Town, because its people are busy making toys of all kinds. Beside the railway station is a huge wooden hobby horse, which has been erected as a sign of the industry.

Massachusetts has some of the biggest paper mills of the United States. Holyoke turns out two hundred tons of fine paper daily, and at Dalton in the Berkshire Hills the paper for our bank notes and government bonds is made. This paper is carefully guarded that it may not get into the hands of counterfeiters, and men with rifles in their hands stand at the doors to keep out visitors.

It is in this region that we can learn all about watches. Southern New England has hundreds of men and women working on such timepieces. The simplest watches have only about one hundred and fifty parts, and the more expensive ones several times that number. We are surprised at the care with which every part has to be made. As we go through the factories we see that the power from steam and water do only a small part of the work. Many men and women are required to run the machines and to perform certain other kinds of labor. Some of the steel screws of a watch look like grains of sand; they are so minute that it would take fifty thousand of them to fill an ordinary thimble.

We are shown hair springs which require so much labor that five dollars' worth of steel wire after being made into them is worth fifty thousand dollars. By this you can see how manufacturing supports a very large population.

Another source of New England's wealth is its commerce. If you will look at the coast of Maine, you will see that it runs in and out almost like the teeth of a saw. It is called the "State of One Hundred Harbors." There are fine harbors in Massachusetts, and good landing places for ships all along the south coast of New England almost to New York.

Customhouse, Boston.

What industries do you think would be carried on along such a coast?

There would be much shipping and many sailors. The boys, hearing the sea captains tell their adventures, would want to go to sea and become captains too. Well, this is just what has happened. There are more than twelve thousand Maine men who are sailors, and many New Englanders are to be found in the navy. During my travels in Asia I found a Massachusetts sea captain commanding a steamer on a Chinese river, and there are New England sailing vessels everywhere. This part of our country has a large foreign commerce. Boston has forty miles of water front, and ships from all over the world. A great quantity of our goods are exported to Europe and other countries through that port, and others of New England. The other chief seaports are Portland, Maine; Bridgeport, Connecticut; and Providence, Rhode Island, all of which have excellent harbors. Many of our battleships, destroyers, and merchant vessels are made at Fore River, near Boston.

New England is covered with steam railroads, electric trolleys, and good roads for tractors and automobiles. The chief railway system is the New York, New Haven and Hartford, extending from Boston to the west and south. The Boston and Albany, and the Boston and Maine, extend from the city to the west and north. On the railroad which crosses the Hoosac Mountains, there is a tunnel five miles long, which aids in bringing Boston into direct communication with Chicago and the Mississippi valley. It enables much of our wheat and other products to be sent to Boston for export to Europe. The railroads of southern New England cover the country like a net, and an endless procession of freight trains passes over them carrying goods to the many harbors along the coast.

Have you ever thought what a large part commerce has in our daily life? It has to do with every meal that we eat. At our hotel in New York we sat down to dinner before a mahogany table made from trees grown in the West Indies. Our tablecloth was woven from Irish flax, and our knives were of steel made of iron which was dug from the mines of Lake Superior, hundreds of miles to the westward. We drank coffee which had been imported from Brazil, and the sugar we put into it came from the cane fields of Cuba or Louisiana. Some of us drank chocolate, made of cacao beans shipped from South America to Boston, and ground up in a factory near by. We had a splendid cut of roast beef which six months ago was part of an animal galloping madly over some western prairie with a cowboy behind him. We sprinkled it with salt from the salt wells of Michigan, and seasoned it with pepper from the island of Singapore, on the other side of the world. Our bread was of wheat, ground into flour at Minneapolis, and brought down the Great Lakes to be used in New York. The mince pie for dessert was filled with currants from Greece, while the three-cornered nuts with which we finished our meal were shaken from trees in the forests of the Amazon valley.

We thus see how commerce and manufactures everywhere go hand in hand. The factories of New England use enormous quantities of material which is brought here by ships from Asia, Europe, and South America, and we can find things from other parts of the world in almost every factory.

Let us visit one of the shoemaking establishments of Lynn, Massachusetts. Some of the leather was imported from Russia; some of it came to Boston in the shape of hides from the cattle of the South American pampas, and some from those on the plains of Texas. We see skins which have just arrived from France, Germany, or England, and others which were shipped from India, China, or the peninsula of Korea.

It is in turning the skins into leather that manufacture first joins hands with commerce. The skins, when they land in New England, are much as they were when they came from the backs of the animals. They have to be tanned before they can be used. New England has over one thousand tanneries, where the skins are soaked for a long time in vats of water filled with tan bark brought from the forest regions of our country; or else subjected to the chrome process of tanning, where the skins are soaked in mineral and oil solutions. The latter process is used largely for shoe leather. Next the skins are scoured and dried, then greased in order to make them soft, and then covered with blacking, so that a single skin has to be handled many times before it is ready to be made into shoes. The nails, buttons, and strings used in shoemaking are made in separate factories and from materials which come from different localities.

By machinery and by working together men can produce things more quickly and at a much less cost than when one man does all the work with his hands. In the shoe shops of our forefathers one man made the whole shoe, and he probably thought he was doing well if he turned out a shoe in a day. There are machines in the shops of Lynn that will sew six hundred pairs of shoes every eight hours,

Hand finishing department in a New England shoe factory.

and some that will put pegs into the soles at the rate of nine hundred a minute. We find that each part of the shoe is made by a different machine, and that one man works upon certain parts only.

All kinds of manufacturing are now done in this way. It takes many, many men to produce one piece of cloth; and if we should go to Bridgeport or Hartford, Connecticut, or to Providence or Newport, Rhode Island, or to Springfield, Massachusetts, where there are large firearms factories, we might see guns which have many parts, each part made by a different man. Many of the rifles, machine guns, automatic pistols, and other weapons used by our soldiers in the World War were made in New England.

1. Bound New England. What country lies on the north? What state on the west? What New England states border the Atlantic Ocean?

2. Name the New England states. Compare each state with one other state of the Union. Compare the size of your state with each of the New England states. (See page 492.) Find the area of New England. What states of the Union exceed it in size? Which New England state has the largest population? Why?

3. Who visited the coast of New England before 1500? Who was John Smith?

4. Name the five chief rivers of New England. Why do they furnish so much electric power? What are the advantages of water power? How much such power has New England? Compare its water power with that of the United States. With Canada. With several countries of Europe. (See table, page 495.)

5. Mention some New England cities which make cotton cloth. Some which weave wool. Some which make shoes. Write a story of a cotton dress. Of a woolen blanket. (For further information as to each of these, see Carpenter's "How the World is Clothed.")

6. From what town does the paper for our bank notes come? Why is it important to guard the factory where that paper is made? What town is devoted to toys? Name some places where guns are made; ships.

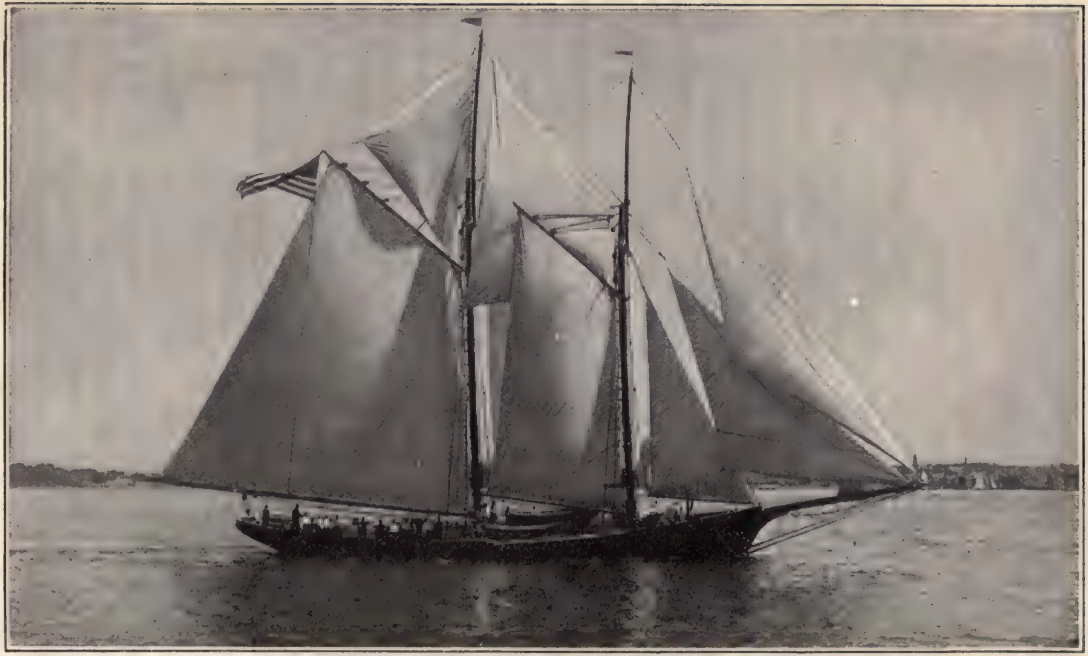
7. Why has New England become a great manufacturing center? A great commercial center? Name the three principal railway systems. Show the part commerce has in our daily life.

XIII. AMONG THE MOUNTAINS AND LAKES OF NEW ENGLAND

WE shall spend a part of to-day among the mountains of New England. The Appalachians, which begin in northern Alabama and form the eastern rim of the Mississippi and St. Lawrence basins, extend northward through New England into Canada. They are made up of many parallel ranges, which, with their valleys, occupy a space about one hundred miles wide. The highest elevations are to be found in North Carolina, but the most picturesque parts are in New England. The White Mountain region of New Hampshire is so beautiful that it has been called the Switzerland of America.

The highest of the White Mountains is Mount Washington. We can go in an ordinary train to the foot of this mountain, and from there to its summit over one of the oddest railroads in the world. The mountain is more than a mile high, and this railroad goes right up to its top. The track is so steep that it looks more like a ladder than a railroad, and the cars at times are at such an angle that one might think they would slide to the bottom.

This is prevented by an interesting device. The track has three rails instead of two, and the rail in the center consists of two bars of iron, with connecting crosspieces placed four inches apart throughout its whole length. The little locomotive has wheels which rest on the outer rails, and also a wheel with cogs which fit into this central rail,



New England fishing schooner. Such boats are well equipped and speedy.

the cogs moving upon the crosspieces. The car in which we ride is in front of the engine, and the engine pushes rather than pulls us upward into the clouds.

Upon fine days, such as the one we have for our journey, the car windows are open, so that we can see almost as well as if we were in an automobile. We sit with our backs to the summit, looking down the mountain; and as we rise we behold masses of cloud nestling in the hills below us. Nearer the top we pass through volumes of mist, and at the summit are enveloped in clouds.

At last the sun clears the sky, and we enjoy the magnificent views to be had all about us. We can see the other mountains of the Presidential Range. There are Mount Adams, Mount Jefferson, and Mount Madison, all of which are more than a mile high; and near them are lesser mountains, named after Presidents Monroe and Jackson. From the summit we get a peep into Canada, and away off in the distance lies Mount Katahdin in Maine.

Indeed, New England is one of the chief playgrounds of our country. In Maine alone there are more than ten million acres of wild forest in which to hunt, and two thousand fresh water lakes where one can fish. New Hampshire has more than half a million acres which are from one half mile to one mile above the sea, and the Atlantic coast, from Connecticut to Maine, is lined with seashore cottages. More than one hundred thousand tourists go every year to New England, and they spend more in one summer than we get in that time from Alaska's gold mines.

We can have good fishing almost anywhere. There are trout streams in the mountains, and along the coast the fish swarm to such an extent that sea food is caught and exported to all parts of the United States. Boston markets ten million dollars' worth of fish in one year.

New England's fishing fleet numbers almost two thousand boats, many of which are sailing vessels known as schooners. They stay out at sea for a month or more at a time, bringing back cargoes of cod and other fish. The chief fishing grounds are on the Banks of Newfoundland, although some of the vessels go as far as Iceland and Greenland.

In our travels through the mountains we shall see the wealth that New England has in its hills. We know that the streams flowing rapidly down them supply the water power which moves many of the factories in the lowlands. The mountains furnish also other things of value, although they have no great beds of coal and iron, such as are found in the Appalachian chain farther south.

The stone of New England is worth a great deal of money. We find great quarries in Vermont, New Hampshire, Maine, and Massachusetts, in which granite is being blasted out with dynamite and cut into blocks to be shipped to all parts of our country. Many of our cities are paved with granite which has come from this region, and some of our public buildings are made of such stone. Almost half of all the marble used in our country comes from Vermont, although much is now being quarried in parts of Tennessee and Georgia.

In visiting the various quarries we see that more care is used in getting out marble than in quarrying granite. The rough blocks are cut by a long strip of steel called a sand saw. A little groove is cut in the stone, and filled with sand. Then the steel strip is moved by machinery back and forth so that it rubs the sand in the crack against the marble, and the sand does the cutting. After the stones have been sawed into the proper shapes, they are carefully smoothed and polished. They are then ready for shipment, and are sent away on cars.

Granite quarry. The cranes are used to lift out the blocks of stone.

A great many slates are made at Bangor, Maine, and there we can see boys and girls attending the machines which turn out thousands of school slates and also the slate used for roofing.

But there is something made in New England which every boy and girl is glad to get. I refer to maple sugar, which comes from the sap of the maple tree. The sap is gathered in the spring, after the first thaw, at which time it begins to move in the trees. Holes are then bored in the trunks not far above the ground, and wooden tubes are driven into them. Soon the sap begins to flow. It oozes from the trees into the tubes, and drop by drop falls into the buckets which are hung beneath them or placed at the foot of the trees. As the drops hang on the end of the tube they look just like water. Catch one of them upon your finger and taste it. It is sweet. The water in the bucket is called sugar water.

After the buckets are filled, the sugar water is carried to the sugar house, where it is put into large kettles to be boiled. The water evaporates as the boiling goes on, and there is left a sirup which grows thicker and thicker. When it is thick enough for table use, a part is taken out and poured into cans. The rest is boiled still longer and is run off into molds, and as it cools it hardens into sugar. Farther on in our travels we shall visit Louisiana, where much of our cane sugar is made, and later California, Utah, and other states of the West where millions of tons of sugar are made from beets every year.

Gathering sugar water from the buckets.

XIV. BOSTON

WE have no trouble in going to Boston. It is the largest and wealthiest city of the northeastern section of our country. It has railroads to all parts of New England, and one of the best harbors of the Atlantic coast, a great bay protected by many islands. It has one of the largest piers in the world, so long that it can accommodate five great ocean steamers at one time.

Boston is so situated that it forms an excellent port for the shipping of goods to and from other parts of the United States and also to and from South America and Europe. It is a day's sail nearer the chief ports of western Europe than New York, and is nearer Rio de Janeiro than New York, Philadelphia, Galveston, or New Orleans. There is much sea commerce between Boston and New York, and this has been increased by the Cape Cod Canal. This canal crosses the Cape Cod peninsula, shortening the distance between Boston and New York by more than seventy miles, and enabling the ships to avoid going around Cape Cod, where within a period of fifty years more than twenty-five hundred vessels were wrecked, and eight hundred lives lost.

The Cape Cod Canal is a sea-level canal. It is eight miles long, thirty-five feet deep, and one hundred feet wide at the bottom. It forms a part of the Atlantic Intra-Coastal Waterway, an inland passage which, when completed, will extend from Boston south through New Jersey, Delaware, Maryland, and other states of our Atlantic coast.

The harbor and landing facilities of Boston allow the materials for manufacturing to be brought in so cheaply that it has become a great commercial city. It is the chief wool market of the United States, our largest fish market,

Cape Cod Canal is electrically lighted so that ships can pass through by night as well as by day.

and in or near it are the principal leather, shoe, and shoe machinery centers, the leading textile and chocolate industries of our country, and the largest candy factories of the world. Boston has more than one hundred thousand persons working in its industrial establishments. It has about seven hundred and fifty thousand inhabitants; a million more live within a few miles of its center, and three and one half millions are within two hours' ride by rail.

As we step from the cars the streets seem even more crowded than they were in New York. The railroad station covers more than eleven acres, and over four hundred trains go in and out of it every day. The city has surface and elevated railways, and also underground roads, which carry several hundred millions of passengers each year.

We first visit the old business section. Here the town seems cramped, and the streets are narrow and crooked, although within the past few years many millions of dollars have been spent in widening and straightening them. The buildings are high, and between Washington Street and Boston Common they contain so many people that they make us think of enormous boxes divided into compartments packed with men carrying on different kinds of work.

We spend some time on Boston Common. This is a beautiful park of forty-eight acres in the heart of the city, which is considered one of the finest playgrounds in the United States. Boston Common is shaded by old elm trees, and at one side of it is a great oblong building whose golden dome may be seen from almost every part of the city. That is the statehouse, where the governor of Massachusetts has his offices and the legislature meets every year to make laws for the state. In the center of the Common is the Frog Pond, about which the boys play in the summer, and at the lower end is a place where hundreds of pigeons fly down every day to be fed.

During our tour about the city we pass other fine parks containing tennis courts, golf grounds, baseball diamonds, and open-air gymnasiums. We are told that Boston has more public playgrounds than London, Paris, Berlin, or New York. It has many beautiful streets. Commonwealth Avenue, for instance, is almost one hundred feet wider than Pennsylvania Avenue in Washington, and through its center runs a park of trees, among which are footpaths. There are fine residences on both sides of the avenue, and at night, when the street is lighted with four rows of lamps, and the automobiles of rich Bostonians are passing to and fro upon it, it presents a splendid sight.

The Bostonians have always been noted for their culture and learning. Their city is called the Athens of America, and some of our best-loved authors have come from here. Nathaniel Hawthorne, who wrote "The Wonder Book" and "Tanglewood Tales," lived many years at Salem, near Boston, and was once employed in the Boston Customhouse; Prescott, the blind historian, the author of "The Conquest of Mexico," lived in the city; and Bancroft, Longfellow, Lowell, and Holmes resided at Cambridge, near by. The city has large book stores and publishing houses, and its libraries and museums are among the best to be found anywhere. It has musical, scientific, and other schools, as well as several large colleges. At Cambridge we visit Harvard University, which has now about nine hundred teachers and more than seven thousand students. It is our oldest university, having been founded in 1636, or more than sixty years before the opening of Yale at New Haven, Connecticut.

Yale and Harvard were for a long time the most famous

Part of the Massachusetts Statehouse, facing Boston Common.

Boston is noted for its fine playgrounds.

of our colleges; but to-day there are good schools and colleges in every part of the United States.

It was in Cambridge that General Washington took command of the army of the Revolution. This was on the third of July, 1775. Boston was then in the hands of the British, but General Washington took it about eight months later. We can visit Dorchester Heights, where Washington put his cannon during the last of the siege. From these heights he could fire upon the city and at the ships in the harbor, and thus he forced the British to leave.

New England people have always been noted for their bravery. Everywhere in Boston we see things which remind us of the stirring times of the past, when it took real courage to be a true American citizen. Let us ride out to the Bunker Hill Monument. It stands on the site where the Americans fought the British so bravely before Washington came. This section of Boston is now thickly settled, but the monument marks the place of the battle. It is a shaft of granite, the corner stone of which was laid by General Lafayette in 1825. There are steps inside it by which we can walk to the top and look over the city. On the ground below us we see the statue of Colonel William Prescott, who commanded the Americans that day. It represents him as he looked when the British were coming, and when he held back his men until they could do the most damage, saying: "Don't fire till I tell you! Don't fire till you see the whites of their eyes!"

Later on, as we stroll along the wharves of the harbor, we think of the famous Boston tea party, when fifty of the men and boys of the town, disguised as Indians, ran yelling down to these wharves, and, boarding the British ships which were loaded with tea for America, emptied the chests of tea into the water.

The British government had said that Americans must pay taxes upon imported tea, but the Americans claimed that the British government had no right to tax them without their consent. Hence for a long time they refused to drink tea, or to wear any kind of goods from England. They decided to dress in clothes made in America, and to drink tea of sage, sassafras roots, and other American plants. The Boston tea party helped to bring on the Revolutionary War, which began as a struggle between parties in the British Empire and ended with the independence of the United States.

We next visit the old North Church, in the steeple of which the lanterns were hung that night when the British soldiers started out on their march to Concord. The lanterns warned the patriots across the river that the British were coming. This signal had been planned by Paul Revere, who so bravely carried the news from Boston to Lexington. Longfellow's poem tells how Revere sprang to his saddle, and then there was—

> "A hurry of hoofs in the village street,
> A shape in the moonlight, a bulk in the dark,
> And beneath, from the pebbles, in passing, a spark
> Struck out by a steed flying fearless and fleet;
> That was all! and yet through the gleam and the light
> The fate of a nation was riding that night;
> And the spark struck out by that steed in its flight
> Kindled the land into flame with its heat. . . .
> You know the rest. In the books you have read
> How the British regulars fired and fled,—
> How the farmers gave them ball for ball,
> From behind each fence and farmyard wall;
> Chasing the redcoats down the lane,
> Then crossing the field to emerge again
> Under the trees at the turn of the road,
> And only pausing to fire and load.

"So through the night rode Paul Revere;
And so through the night went his cry of alarm
To every Middlesex village and farm,—
A cry of defiance and not of fear,
A voice in the darkness, a knock at the door,
And a word that shall echo for evermore!
For, borne on the night wind of the past
Through all our history, to the last,
In the hour of darkness and peril and need
The people shall waken and listen to hear
The hurrying hoof beats of that steed,
And the midnight message of Paul Revere."

There are many places about Boston which will always be noted in the history of our country. Plymouth, where the Pilgrims landed from the *Mayflower* after they had crossed the ocean, is only thirty miles away. We reach it by automobile in but little more than an hour. It has about ten thousand people, and one hundred thousand tourists visit it every year. As we look at its comfortable homes we cannot realize the hardships our forefathers suffered during their first winter in New England. The *Mayflower* came into the harbor at Plymouth on a cold December day in the year 1620. She had just one hundred passengers. Most of them, on account of their religion, had been driven from England to Holland, and had now come to America that they might be able to worship God in their own way. They stepped from their boat upon a great stone, which has become famous as Plymouth Rock, and is now honored by all New England people.

From the time of their landing, the Pilgrims were in great fear of the Indians. They had no houses at first, and in the rude huts which they put up they suffered such privations that more than half of them died within less than a year.

We find many relics of these times in Pilgrim Hall. Here is the very sword which Miles Standish, the chief soldier of the colony, used in his fights with the Indians; and, even more interesting, the cradle in which the first white child born in New England was rocked. This cradle is a little wicker affair with rockers of wood. It is much like a basket with a sort of hood at the back. As we look, we can see in our imagination poor little Peregrine White, for that was the baby boy's name, crying in it all alone; and we can realize somewhat the extent to which our country has grown when we learn that now more than two million American babies are born every year.

1. Locate the Appalachian Highlands. Through what states do they extend? Describe our trip to Mount Washington.

2. Locate Cape Cod Bay. Buzzards Bay. What canal joins them?

3. Describe New England as a national playground. What advantage are good roads to a country?

4. From what section do we get most of our maple sugar? How is it made? What other kinds of sugar do we make? (See Carpenter's "How the World is Fed," pages 328-345.)

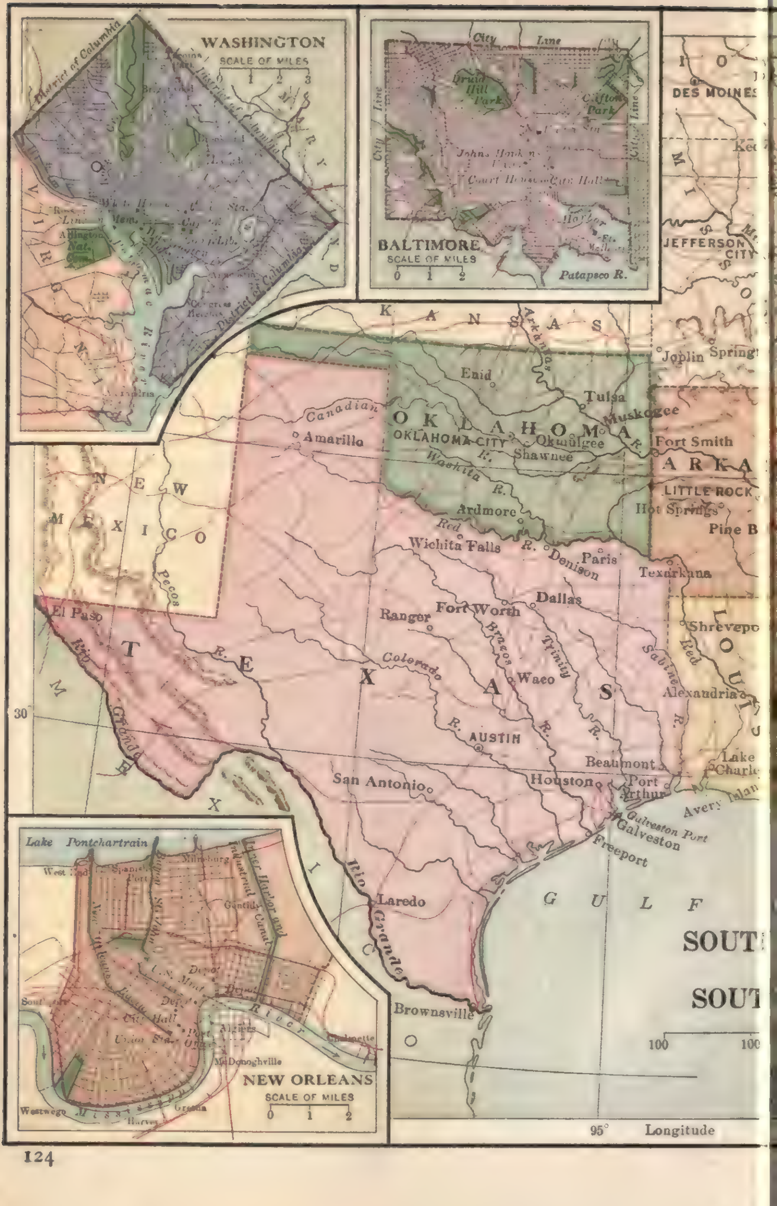
5. Tell how granite and marble are cut. What famous marble quarries has Italy? (See Carpenter's "Europe.")

6. Locate Boston. Take a trip to it from your home, naming the cities through which you pass. Why is it called the Athens of America? Name several historical events which happened there.

7. What advantages has Boston as a seaport? Compare it with New York. Trace a cargo of wool from Argentina to Boston. By two routes from Melbourne, Australia. Trace a shipload of anthracite by the shortest sea route from New York. Of bituminous coal from Norfolk. Of cacao beans from Guayaquil, Ecuador.

8. Why is Plymouth Rock of special interest to New England? Who were the Puritans? Our Pilgrim Fathers? What poet has written much about them? Where did he live?

9. Where are the world's greatest candy factories? Trace a cake of chocolate from the cacao bean to the confectioner's store. (See Carpenter's "How the World is Fed," page 317.)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SCALE OF MILES
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District of Columbia
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Arlington Nat. Cem.
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City Line
Druid Hill Park
Clifton Park
Johns Hopkins Univ.
Court House
City Hall
Harbor
Ft. McHenry
Patapsco R.
IOWA
DES MOINES
MISSOURI
JEFFERSON CITY
KANSAS
Arkansas
Joplin
Springf
Enid
Tulsa
Muskogee
OKLAHOMA
OKLAHOMA CITY
Okmulgee
Shawnee
Washita R.
Ardmore
Canadian
Amarillo
NEW MEXICO
Pecos
Fort Smith
ARKA
LITTLE ROCK
Hot Springs
Pine B
Red R.
Wichita Falls
Denison
Paris
Texarkana
Dallas
Fort Worth
Ranger
Brazos
Trinity
Sabine R.
Shrevepo
Red
LOUI
Alexandria
El Paso
Rio Grande
TEXAS
Colorado R.
Waco
AUSTIN
Beaumont
Port Arthur
Lake Charle
Avery Islan
Houston
San Antonio
Galveston Port
Galveston
Freeport
MEXICO
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Laredo
Brownsville
GULF
SOUT
SOUT
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95°
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Lake Pontchartrain
West End
Spanish Fort
Milneburg
Bayou St. John
Industrial Canal
Inner Harbor and
Gentilly
New Orleans
Depot
U.S. Mint
City Hall
Union Sta.
Post Office
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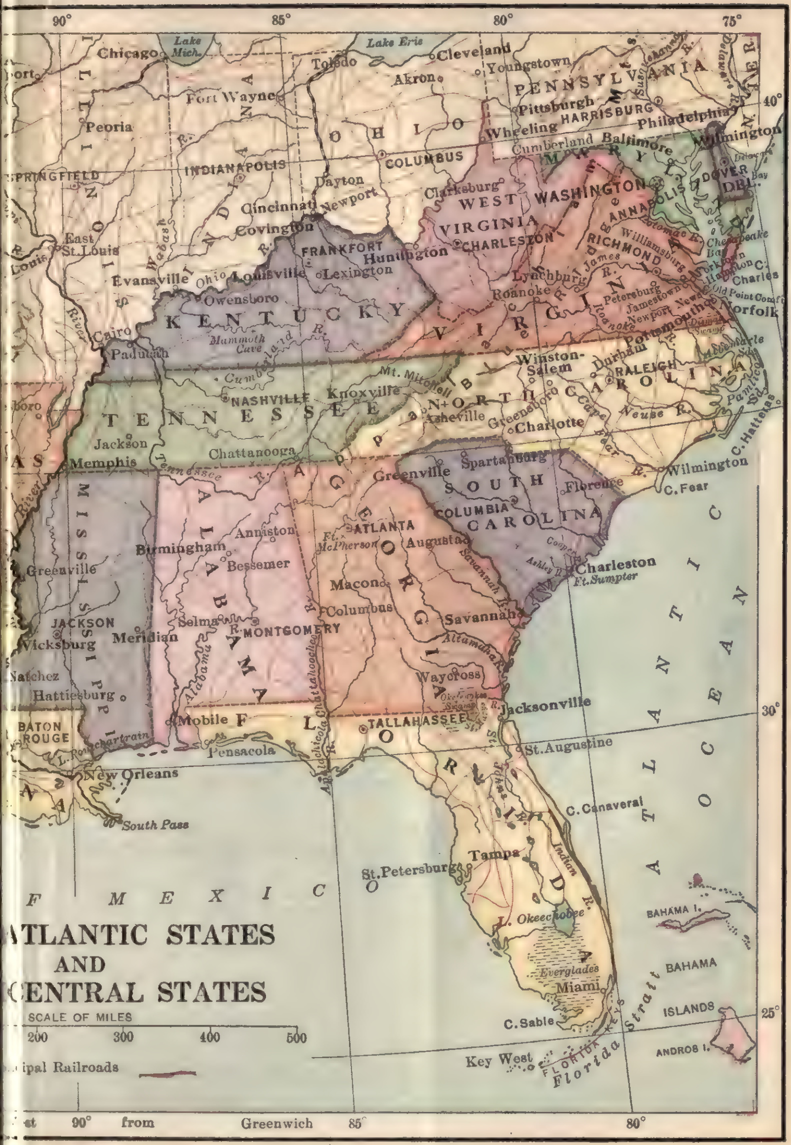


TLANTIC STATES
AND
CENTRAL STATES

SCALE OF MILES
200 300 400 500

ipal Railroads

XV. THE SOUTHERN STATES—FROM BOSTON TO NORFOLK BY STEAMER

WE leave New England to-day. We are going to travel through our southern states. We are bound for the lands of the sun. The southern states embrace nearly one fourth of all the land under Uncle Sam's flag. They number sixteen, and most of them are large. Texas is four times as big as New England, with thousands of square miles to spare. Kentucky is about five times as large as Massachusetts. The rich farms of Oklahoma exceed in area those of Illinois or Iowa. Alabama is larger than Pennsylvania, and Tennessee is larger than Ohio.

This section is one of enormous resources. It contains our chief cotton and tobacco lands, and in some years it produces one third of our corn. It has mighty forests, with thousands of sawmills at work. It has rich mines of iron, and its coal fields supply a large part of our fuel. The Appalachian Mountains of the South have waterfalls with millions of undeveloped horsepower, and the oil fields of Texas and Oklahoma produce a large part of the gasoline which runs our automobiles and motor trucks, as well as the fuel oil employed in our industries, and the kerosene which lights many homes.

The South is the great winter market garden for the large cities and towns of the North. It produces more than a half billion dollars' worth of fruit and vegetables every year. A vast trucking industry is carried on in the lowlands along the coast from Virginia to the Mexican border.

There are good steamers from New York and Boston to our southern ports, and we might take a ship for Charleston, Savannah, Jacksonville, New Orleans, or Galveston, but we decide to stop first at Norfolk, Virginia. Steaming out of Boston harbor, we sail about Cape Cod, along the Atlantic coast, past New Jersey, Delaware, and Maryland, to the mouth of Chesapeake Bay. Much of the time we are out of sight of land, and it is two days before we see the lights of Cape Charles, and pass over what is known as Hampton Roads to the mouth of the James River.

Here on our left is the thriving seaport of Norfolk, and upon our right, beyond the wharves, grain elevators, and shipyards of Newport News, is Old Point Comfort, where the first settlers of the Virginia colony landed when they arrived in America from England in 1607, thirteen years before the Pilgrims stepped out on Plymouth Rock. Captain John Smith was one of them. They stayed here for a time, near where the little town of Hampton now is, and then sailed up the James River and founded Jamestown.

It was at Hampton that the Virginia colonists first met the Indians. There are Indians at Hampton now, but we find them more friendly than those who greeted John Smith. Those Indians were half-naked redskins, with paint on their bodies, feathers on their heads, and scalping knives in their belts. The Indians we see belong to the large college at Hampton, where boys and girls from the tribes of the West come to school. They are taught English and learn to lead civilized lives. The boys learn trades and the girls learn how to cook, sew, and keep house. They dress as we do, and were it not for their copper-colored skins, black hair, and high cheek bones, we should not know they belonged to the red race.

What a great number of colored people we see!

We are now in Virginia, where the land, like that of the ates farther south, was once divided into great plantations

Norfolk coal pier. It cost about three million dollars.

worked by negroes as slaves. These dark-skinned people belong to a different race from the whites. The first of them were brought by force from Africa and were kept in slavery until freed by the great Civil War between the North and the South. After the war was over most of the colored people stayed in the South, and in two of the southern states, South Carolina and Mississippi, there are now more negroes than whites. There are so many of them in the United States that they make up nearly one tenth of our whole population.

Our colored people are rapidly advancing in education and wealth. Hundreds of thousands of them own their homes, and among them are farmers and all sorts of mechanics, also writers, lawyers, doctors, and bankers. There are almost two million negro children in our public schools, and there are several hundred colleges where colored students are taught. Hundreds are being educated at the Hampton Institute here.

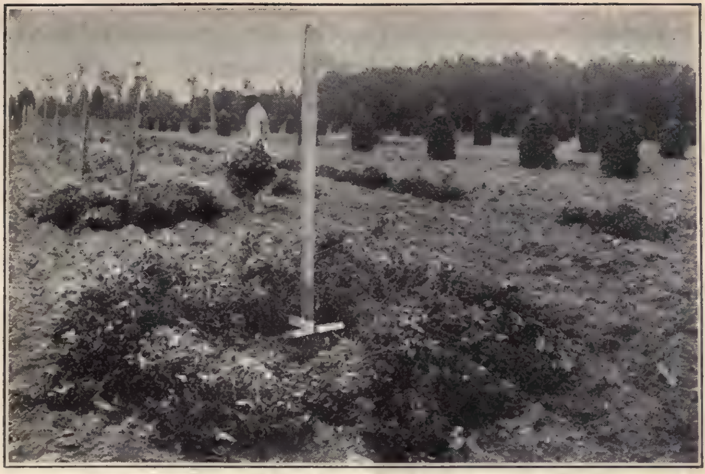
Norfolk is the chief port of Virginia, and Newport News, across Hampton Roads, is one of our chief shipbuilding centers. Both places have deep water and the largest of the ocean steamships can come to their wharves. Much of the coal of Virginia and West Virginia is sent to Norfolk for shipment, about twenty million tons being exported each year. Norfolk is a great lumber port, and from the market farms and gardens surrounding it, many shiploads and trainloads of fruit and vegetables are sent north. The export of oysters and other sea food caught in Chesapeake Bay amounts to millions of dollars per annum.

This region is interesting historically. Not far away is Williamsburg, once the capital of Virginia, where Thomas Jefferson, James Madison, and other great men of our colonial times went to school at William and Mary College, which was founded a few years before Yale. Yorktown, where Lord Cornwallis and his British army surrendered to Washington in 1781, can be reached by automobile from Newport News in two hours, and as we stand on the wharves we can see where the great battle between the *Monitor* and the *Merrimac* was fought in 1862. We can read more about all of these events in our histories.

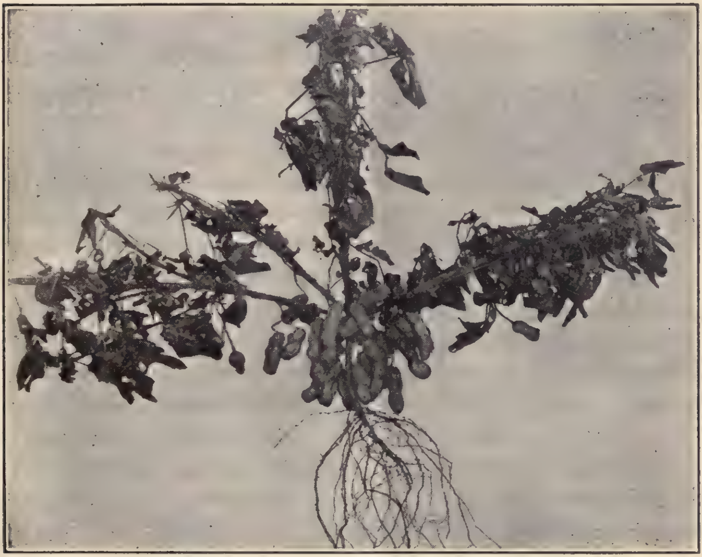
There is another little thing that may not seem important to us, but which is very important to Norfolk. This is the peanut. Norfolk has long been one of the chief peanut markets of the world, and most of the peanuts we buy on the street stands are shipped from here. When you bite into a peanut you may be pretty sure you are biting into a piece of Norfolk. So many peanuts are raised in our country in one year that if they were equally divided, every person in the land might have a half bushel and leave some to spare.

Peanuts are grown also in other parts of Virginia, and largely in North Carolina, Georgia, Florida, Alabama, and Texas. Some of these states give prizes for the best crop of peanuts raised by a member of the peanut clubs formed by the children. Not long ago the Texas prize was won by a girl of fourteen. She raised two hundred and thirty bushels of nuts and had more than two tons of peanut hay from one acre of ground. The prize was three hundred dollars in cash, and in addition she had the profit from the sale of the nuts and hay.

During our stay at Norfolk we learn how peanuts are raised. They are sometimes called ground peas, for they grow underground. The nuts are first shelled, the farmers being careful not to break the little red skins on the kernels, and are then planted like potatoes or corn. It takes about two bushels of nuts to furnish the seed for an acre,



Peanut field. The plants are stacked up to dry.



Peanut plant. The nuts grow in clusters just above the roots.

and this will produce, according to the richness of the soil, from twenty to one hundred bushels.

The planting is done in May, and soon after the little green vines peep forth from the ground. They spread over the hills, sending out little stalks which blossom and finally run down into the soil, with the seed pods on them. The seeds are peanuts.

In the fall the nuts are ready to harvest, and the vines are dug up, and stacked around poles seven feet high, with the nuts hanging to them. About two weeks later the nuts are picked by women and children.

After this the nuts are cleaned in machines and sorted by women and children, who pick out the bad ones as the nuts pass by them on a moving belt about a yard wide. The peanuts are then put into bags and shipped to all parts of the world.

XVI. UP THE JAMES RIVER—THE TOBACCO INDUSTRY

FROM Norfolk we go by steamer up the James River to Richmond, the capital of Virginia. The land along the banks is low, and as we look at the rich farms on both sides of us, we can imagine how happy Captain John Smith and his company felt when they saw the rich vegetation as they sailed over the same river, more than three hundred years ago. We soon reach the little island where they stopped and began building what they thought was to be the great city of the New World.

This was Jamestown, or, as they called it, James City. It was the chief settlement in Virginia when Virginia included our whole eastern coast from Maine to Georgia.

There is nothing like a city at Jamestown to-day. All we can see are a few graves and the church with its ivy-covered tower. The church is new, and was built recently to take the place of the original structure, but the tower is the one that was put up by the Jamestown colonists. Not a man is in sight. The only signs of life are some sheep eating grass near by, and the only sound is the croaking of a frog.

The Jamestown colony had a worse time than the Plymouth colony. The Indians fought the white men, hiding in the woods about the little settlement, and killing those who ventured out. During one of the Indian sieges of Jamestown the colonists could get nothing to eat, and were forced to feed upon dogs, horses, and all sorts of reptiles, such as snakes and toads. That was when the settlement had grown to five hundred by the landing of more ships from England. The period was known as the Starving Time; and when it ended with the arrival of a shipload of provisions, only sixty out of the five hundred were alive. At one time the colony was saved by the food brought in by the Indian princess Pocahontas, the girl who saved the life of John Smith.

One would think that with such troubles the English would have given up trying to settle America. The colonists failed to find any gold, but the land proved to be rich, and as time went on, tobacco raising became profitable.

We do not think it is good for men to use tobacco. Nevertheless it is one of our most valuable crops, and we decide to go south from Richmond to visit the plantations and learn how it is raised.

No one in Europe knew anything about tobacco until Columbus discovered America. Like maize or Indian corn, and the potato and tomato, the tobacco plant was

Scene in a tobacco market. The dried leaves are made into piles to be sold.

first found on our hemisphere. Among the stories which the explorers of these early days told when they returned to Europe, was how the Indians ate fire and breathed the smoke from their nostrils. Many of the travelers learned to use pipes, and to smoke as the Indians did. They introduced the custom into Europe, and it became fashionable.

Sir Walter Raleigh was one of the first smokers in England. One day, it is said, when he was puffing away at his pipe, a new servant came in with a pitcher of ale in his hand. When he saw the smoke coming out of Raleigh's nose he thought his master was burning up, and threw the ale over him to put the fire out. Raleigh had sent several expeditions to America, and Ralph Lane, the captain of one of these, brought some tobacco home with him.

At one time the Virginia colonists used tobacco as money, so that the people took it to the store to buy sugar, tea, and other things for their tables. Tobacco is now grown to a large extent not only in Virginia, but also in Kentucky, North and South Carolina, Tennessee, and Maryland. Some kinds are raised in Ohio and Wisconsin. Connecticut makes the best wrappers for cigars, while Pennsylvania, Ohio, and Wisconsin produce fillers, or the material inside the wrappers. The southern states make most of the chewing tobacco and snuff.

We now produce about three fifths of all the tobacco used by man, our chief competitors being British India and several of the countries of Europe.

We shall see tobacco fields everywhere as we ride southward through Virginia and North Carolina. The plants have leaves much like those of cabbages, but they are longer and smoother, dark green, and spaced apart on the stalk. The stalks are as big around as our thumbs, and some are so tall that we could use them for canes.

On a Connecticut tobacco farm. The plants are grown under a canvas tent.

The planting is done in seed beds in the spring. After a short time the little green sprouts come up. In five or six weeks the young plants are taken up and set out in rows in the fields. They are carefully cultivated throughout the summer and are harvested in the fall. As the plants ripen the leaves become yellow. At the proper time the tobacco farmer cuts off the stalks close to the earth and hangs them on sticks which are stuck in the ground. In some places he strips the leaves from the stalks and strings them on wires.

The leaves must be cured before they can be sold. This is done in tobacco barns. Some of them are little wooden cabins without windows, in each of which is a stove with flues or pipes that run through the barn. The leaves are hung up in the barn, and the place is kept as hot as an oven, day and night, until they are just right for the market. In some other localities the crop is cured in a different way, without the use of stoves; and in some places the tobacco is raised under great tents, hundreds of acres being shaded with white cotton cloth. Such cultivation often costs more than one thousand dollars per acre.

We stop for a few days in Richmond. It is situated on the James River, one hundred and thirty-seven miles from the ocean. The stream here has a fall of one hundred feet in six miles, furnishing much water power; and as the city has also cheap coal, it is a great industrial center.

We motor about Richmond, visiting the parks, the old capitol building, the former residences of Chief Justice Marshall and of General Lee, and take a look at the many statues which commemorate Virginia's historic past. The state was the birthplace of eight Presidents, although all did not live here at the time of their election. It was in Richmond that the Confederate States had their capital

Statue of General Robert E. Lee in Richmond. The city is noted for its fine parks and monuments.

during our great Civil War. It was here, in St. John's Episcopal Church, that Patrick Henry sounded one of the watchcries of the Revolution in his famous speech, closing with the words, "Give me liberty or give me death!"

1. Make a sketch map of the southern states. Which is the largest? The smallest? What great mountain chain runs through some of them? What great plain? Which state is a peninsula? Name the five principal rivers. Which state has the longest seacoast? Which have no seacoast?

2. Locate Norfolk and Jamestown. Compare Jamestown with Plymouth, telling all you can about the two colonies.

3. Who was John Smith? Pocahontas? Tell the story of the life of each.

4. What schools do we find at Hampton? Mention some of the exports of Norfolk. Why is it a great port?

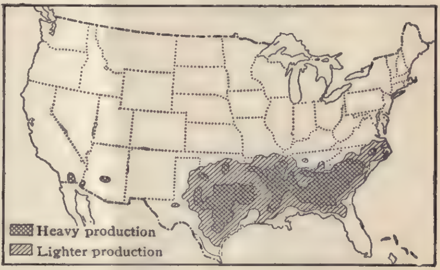
5. What nut forms an important crop of the South? Where does it grow best? Bring one to class, and let it tell the story of its life and the industry.

6. Describe our tobacco industry. Why is it important to our country? What other plants of note originated in America?

7. Locate Richmond. Take a trip through it and tell what you see. What Presidents were born in Virginia?

XVII. IN THE LAND OF COTTON

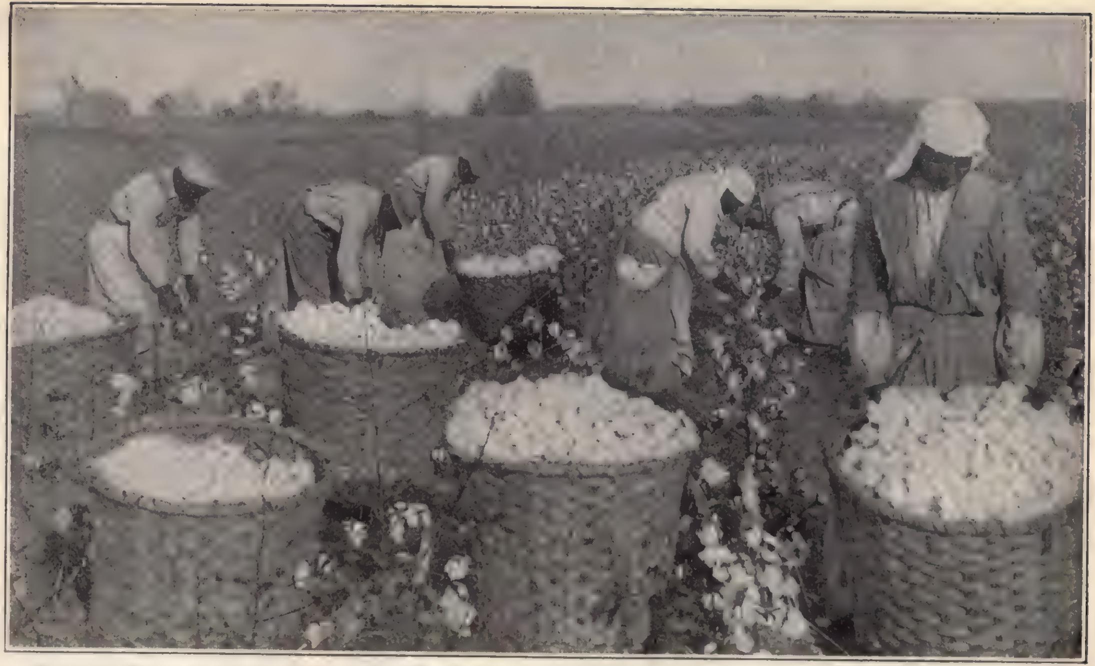
LEAVING the tobacco lands of Virginia, we move on farther south, and soon find ourselves in the land of cotton. The cotton belt of the United States begins in North and South Carolina, and runs through Georgia, Alabama, Mississippi, Louisiana, Texas, Arkansas, and Oklahoma. A good idea of it can be gained by looking at the map. Of all the states, Texas produces the most cotton, its annual yield being about one fourth of the crop. Much cotton comes also from irrigated places in the arid lands of California and Arizona. This is of a very fine staple, and is used largely in the making of motorcar tires.



The cotton belt.

Do you realize how important the cotton crop is to our country?

It is so valuable that if all the gold dug from the mines of the whole earth in one year were put into one pile, and the



Cotton pickers at work. The huge baskets will be emptied into trucks that carry the cotton to the gin.

cotton annually shipped to Europe were stacked up beside it, the cotton pile would be far the more valuable. A bale of cotton is about two or three feet square and five feet in length. Laid end to end, the bales we make in one year would extend twice as far as the distance from the plantations to China. Loaded upon cars at forty bales to the car, they would fill a solid train reaching from Cape Cod to Puget Sound, and on a long way toward Alaska.

We usually produce over half, and in some years three fourths, of all the cotton grown upon earth, so that we furnish the cotton cloth for the greater part of mankind. There are yellow people in Asia, black people in Africa, brown people in the Philippines, red Indians in South America, and white people in Europe, all clad in our cottons. The sewing of the world is done with cotton thread, our common clothes are cotton, and at night we sleep between cotton sheets.

But why does the United States produce so much more cotton than any other land?

It is because we have the conditions best fitted for that crop. Cotton requires a good soil and a season of seven or more months without frost and with not too much moisture. This is found in the cotton belt, and especially in a string of little islands off the Atlantic coast of South Carolina and Georgia. Upon those islands is grown our sea-island cotton, one of the best varieties known to man. Here the plants are much larger than those of other parts of our country. The ripe cotton shines like satin, and its fibers are longer than those grown in other regions.

Have you ever seen a cotton plantation?

When the cotton is ripe, it is one of the most beautiful sights of the world. The plants are about as high as your waist, and shining out on the brown and green background of the bushes, are many white bunches that look like soft balls of snow.

We pass many such fields in our travels. They are dotted with pickers. Negro men and women walk through the rows, pulling the white lint from the stalks and putting it into bags or baskets. They sing as they work, and their rich, soft voices float into the car windows as we ride by.

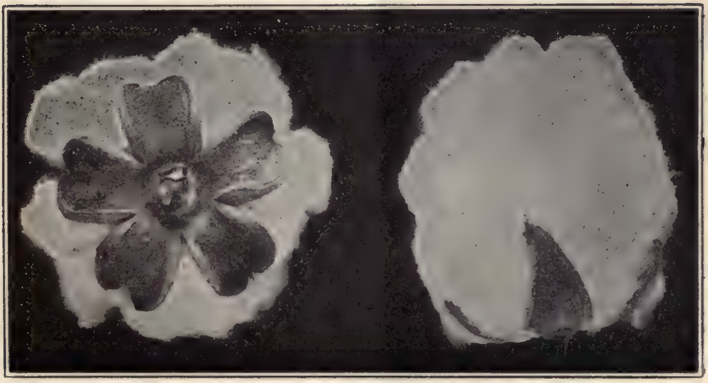
At the stations are piles of cotton bales waiting to be shipped to the factories of New England or to other parts of the country. Some will go to the seaports, where they will be rebaled and exported to Europe. Every little farmhouse we pass has one or more bales in its yard. Upon the country roads we see motor trucks and wagons filled with freshly picked cotton on its way to the gin, where the seeds must be taken out before it can be sold.

But let us visit one of the great cotton plantations of South Carolina. We are now in a field which is not yet ripe. It is filled with green bushes, upon which are the bolls containing the cotton. The largest bolls are about the size of a walnut with the hull on. Farther over is a field where the bolls are cracking open and the green bushes seem dusted with white. That cotton is almost ripe, and it will soon be ready for picking.

Look farther on. There is a spot where the soil must be richer. The bolls on the lower branches are open, and great tufts of white hang out as if ready to drop into the hands of the pickers. The bolls on the higher branches are still closed.

Let us go into that ripening field and examine the cotton. We pull some bunches of white from the bolls. They come out so easily they almost fall into our hands. What are the hard little things we feel inside the soft lint? Let us pick it apart and see. Those are the cotton seeds. They are black

A branch of cotton ready for picking.



Cotton bolls fully ripe.

or dark brown and as big as the seeds of a lemon. They must all be removed before the cotton is sold. We shall see how this is done later on.

It is from such seeds that the cotton plants grow. The farmer tells us that his seed was planted in April, in rows of hills about three feet apart. He says the sprouts soon came through the soil, and that by the middle of June the field was filled with green plants upon which were beautiful flowers. As they burst into bloom they were white; the next day they turned red, and looked like roses. They soon dropped off, however, and the bolls of cotton appeared. The bolls do not crack open until they are ripe, and it is then only that the white fibers show.

From what we have seen we know that the bolls do not all ripen at once. For this reason the pickers have to go over a field many times. In Texas and other parts of the far South the harvesting season begins in July. Farther north it is later, and in Georgia, South Carolina, and parts of Texas some of the cotton is often on the stalks at Christmas.

After picking, the cotton is carried to the gin. There is a wagonload now. Let us jump in and go along with it. The negro driver is good-natured, and he laughs loudly as we drop down into the load of fleecy white. At the ginhouse we crawl out, covered with lint, and watch the men throw the cotton into a machine where it falls between fine circular saws so arranged that the seeds can just pass between them. The lint is caught by the teeth of the saws and torn from the seeds, while the seeds drop below.

Between the saws are stiff brushes which pull the cotton from the teeth and roll it out in a beautiful, fleecy sheet. As it drops on the floor at the side of the gin it looks like a drift of pure snow. The machines that do this work are the outcome of the invention of Eli Whitney, a Massachusetts man, who made the first gin while teaching school in the South. Before that, the cotton was taken from the seeds by hand. Then one man could seed less than one pound a day, and it took him almost two years to seed a whole bale. Some of the gins will now turn out fifty or more bales in a day.

As it comes from the gin the cotton is ready for baling. By this is meant packing it into such bundles as will take up the least space on the cars or ships upon which it is to be carried to the markets. This is done in huge presses which so squeeze the cotton together that a great quantity of it is pressed into a bale about two feet square and five feet in length. It is next wrapped with rough cloth much like coffee sacking, and bound with bands of hoop iron. The ordinary bale weighs from four hundred and fifty to

Truck load of cotton on its way from the gin to the factory. The author in the foreground.

five hundred pounds. Its price varies in different parts of the world, according to the amount of the crop.

But what becomes of the cotton seed?

This is carefully saved. It is worth several hundred million dollars a year. A few years ago it was supposed to be worth nothing, and was burned or thrown away. Now it is used for making oil and other things. The seeds are ground, and the oil is pressed out. The crushed seeds are used for making an oil cake, for feeding cattle and other stock. The hulls of the seeds, which are taken off before pressing, are also used for feeding and as a fertilizer.

Cottonseed oil is used in the making of soap. Much of it goes into patent butters, like oleomargarine; and a great deal, when purified, is sold as salad oil, taking the place of olive oil. It is said that much of the olive oil sold in the United States is really cottonseed oil, and that cottonseed oil is sometimes shipped to Italy, where it is labeled olive oil and sent back to us. Many of the workmen in the oil mills use the oil to butter the bread which they take with them for lunch. They put the slices fresh cut from the loaf under the press, where the sweet, warm, fresh oil is trickling out. They tell us it tastes better than butter.

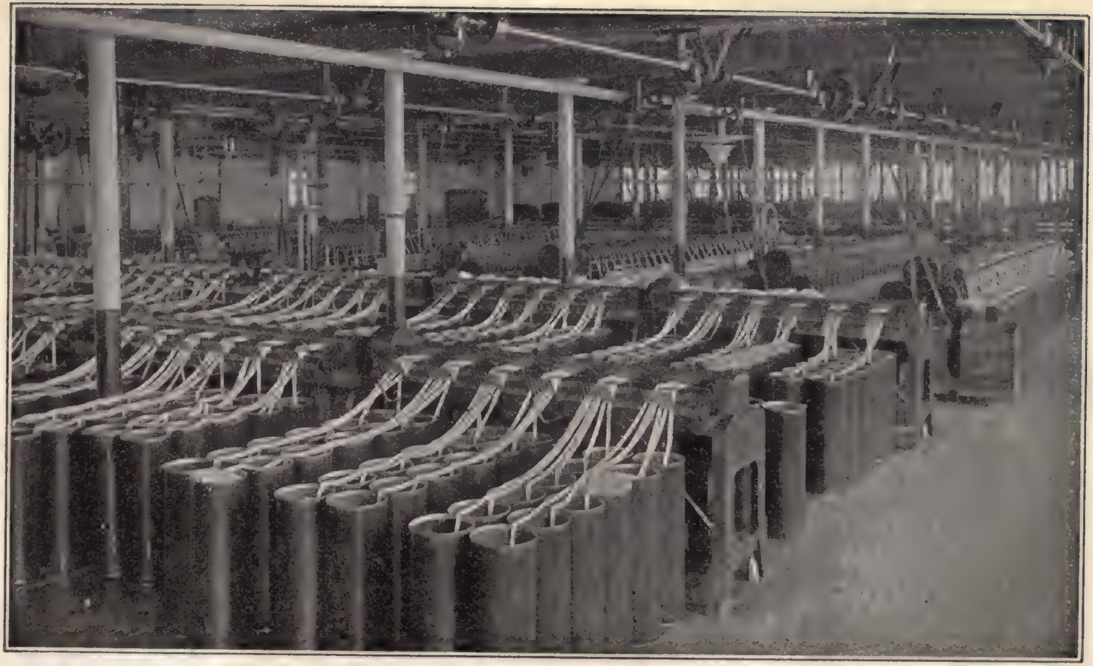
XVIII. IN A GREAT COTTON MILL

WE shall visit one of the cotton factories this morning, and see how the white lint is turned into cloth. Until recent years all our great cotton mills were in New England. We saw many at Lowell, New Bedford, and Fall River in Massachusetts, Manchester in New Hampshire, and Pawtucket, Rhode Island, and we know that a large part of our cotton cloth is still made in New England. We find, however, that many cotton factories have been built in the South. There are large mills at Charlotte and Greensboro in North Carolina, at Spartanburg, Greenville, and Columbia in South Carolina, at Atlanta and Augusta in Georgia, and at very many other places in different parts of the cotton belt. The cotton states have good water power, and the mills are so near the plantations that they can get the raw cotton very cheaply. A large part of the cotton goods of the United States is now woven in the South.

The factory we visit is at Spartanburg, South Carolina. It is in a brick building of three stories, covering several acres. It contains many large rooms filled with interesting machinery, and hundreds of white men and women are at work in it. The cotton is taken almost directly from the gin to the factory. Suppose we follow a bale as it passes through one room after another, until it is turned into cloth.

We first take some raw cotton out of the bale and pull it apart. What queer stuff it is! It is composed of thousands of little white hairs, so fine that several of them twisted together would not be as thick as one hair of your head. These little cotton hairs are called fibers. They are not so long as your finger, and they are so light that there are millions of them in a few pounds of cotton. Still, of these tiny hairs the strongest of thread and cloth are to be made.

Our bale is first taken apart, and the cotton is thrown upon huge cylinders or rollers called openers, which pull the fibers apart. They are then passed through other rollers, the sharp teeth of which take out the dirt, so that when the cotton comes from them not a stick, a leaf, or a



Drawing frames in a modern cotton mill. The ropes of lint are being twisted into thread, on spindles.

grain of sand is left in it. It now feels soft and is whiter than when in the bale.

The next process is carding. In this the cotton is run through rollers covered with wire teeth so fine that there are more than a score of them on a space as small as one's finger nail. These little teeth brush and comb the cotton as it goes through; they pull the tangled fibers apart and make them lie almost altogether one way, so that when they come out at the other end of the roller, they are a rope of cotton yarn as soft as down. It is of this rope that the thread is to be made.

The rope is as big around as a broomstick. It seems enough for a dozen threads, but it is not enough to make one. It is doubled again and again as it goes through other machines which twist it finer and finer, until at last it is no thicker than a fishing line. It is still soft, however. Another strand of the same size, twisted in the same way from another cotton rope, is now joined with it, and the two are twisted and retwisted by machinery until they are as small as the finest cotton thread used for sewing. This is the thread out of which the cloth is to be woven.

As the thread comes from the machines some of it is rolled upon long spools, called spindles, by the mule spinner. This machine takes the place of the old spinning wheel, but it winds hundreds of spools at one time, a single machine doing as much work, perhaps, as in colonial days a thousand women could do. Some threads are wound upon rollers or beams of the width of the cloth to be made. These threads are the warp; they run lengthwise in the cloth.

The cross threads are called the woof or filling of the cloth. They are wound upon small bobbins, which are then thrown from one side of the cloth to the other. This is done in the shuttle, a wooden case which carries the woof thread back and forth through the warp threads at the rate of one hundred and fifty or more times a minute. This is called weaving. The machines with which the weaving is done are the looms. The machinery in the weaving rooms makes a great din, and the looms work so fast that thousands of yards of cloth are woven in one factory in a day.

At Greensboro, North Carolina, we visit a mill which makes cloth for overalls only. Its yearly output is almost fifty million yards a yard wide. The output of one day would carpet a railroad track from New York to Philadelphia, while that of a year, if it could be stretched over mountains and plains and oceans and rivers, would more than cover a path three feet wide reaching clear around the world at the equator.

The rapid spinning and weaving are due to many inventions. The invention of the steam engine by James Watt, and discoveries in the uses of electricity by Faraday, Edison, Tesla, and others, had much to do with giving us the power now used in the mills, while the spinning jenny invented by Hargreaves, and the spinning frame invented by Arkwright, form the basis of the many improvements for turning the lint into cloth.

We shall visit other mills as we go on with our journey· and at every large port we shall see ships taking on cotton for the factories of New England and Europe as well as for China, Japan, India, and South America. Those lands all raise more or less cotton, but our cotton is needed to mix with theirs, as the combination makes better cloth. By far the greater part of our raw cotton goes abroad, the exports bringing in hundred of millions of dollars a year. Our best customer is the United Kingdom of Great Britain and Ireland, which is the chief cotton-weaving country not only of Europe but of the whole world. After that come Germany and France in Europe, and Japan in Asia. There are also large weaving mills in Holland, Switzerland, Italy, Austria, Czechoslovakia, Poland, and Russia, and in China and India.

The foreign factories pay us money for the cotton they buy, and part of that money goes to the boys and girls on our southern plantations as wages. In foreign factories tens of thousands of boys and girls are kept busy spinning and weaving, and from the cloths they have made comes the money paid us; so you see they are working for us. And as they must have our cotton to carry on their business, we are working for them. Moreover, this is true also of the little black, brown, yellow, and white children of other parts of the earth who buy the cloth made from our cotton at home and abroad, so that the whole world really seems to be tied together with these cotton threads. In this way the human race by industry and commerce becomes more and more every day like a family, each member of which is always helping and being helped by the others.

1. Locate the cotton belt. Name five states in it. Name other countries that produce much cotton. (Page 502.)

2. Describe the cotton plant, and tell how it is grown. From what part of our country comes most of the cotton? What kind is raised in the far West, and for what is it used?

3. What inventions have had to do with making the cotton crop valuable?

4. Visit a great cotton factory and tell how thread and cloth are made. What is a spindle? A loom? A gin? A cotton press?

5. To what countries does much of our cotton go? Trace a bale of cotton from New Orleans to Liverpool; to Hamburg; to Yokohama, Japan; to Rio de Janeiro. How far does it travel in each of these voyages? (Pages 496–497.)

6. Where are the world's chief centers of cotton manufacture? Why does New England make so much cloth? Why is so much made in England? (See Carpenter's "Europe.") Why is so much made in India? (For further information about cotton, see Carpenter's "How the World is Clothed," chapters 4, 5 and 6.)

7. What is cottonseed, and for what is it used?

8. Make a list of all the things we get from the cotton plant. Name some part of your clothing which is made of cotton. Describe its travels and adventures from the cottonseed until it came to you.

XIX. ATLANTA, BIRMINGHAM, AND CHARLESTON—THE TURPENTINE INDUSTRY

WE see many more mills as we travel through the cotton belt. The great red-brick, white-windowed factories rise out of the midst of the plantations, and it seems as though the smoke from their stacks might pollute the snow-white bolls of the cotton now ready for picking. Near each factory is its mill village, consisting of one-story cottages of from three to five rooms, and in many a village is a brick schoolhouse, rising high above the homes of the people.

Part of our traveling is done at night, and we see the lights from the factory windows shining out of the darkness. Some of the mills run both day and night. As we go onward the importance of the South as an industrial region grows upon us. We pass many factories of one kind or another run by electricity, and finally come to Atlanta, the capital of Georgia.

Atlanta is one of the most thriving cities of our southern states; it is a commercial and manufacturing center, and it has many beautiful homes. It lies at the base of the Blue Ridge, so high above the sea that its summers are delight-

Airplane view of Atlanta's chief business district.

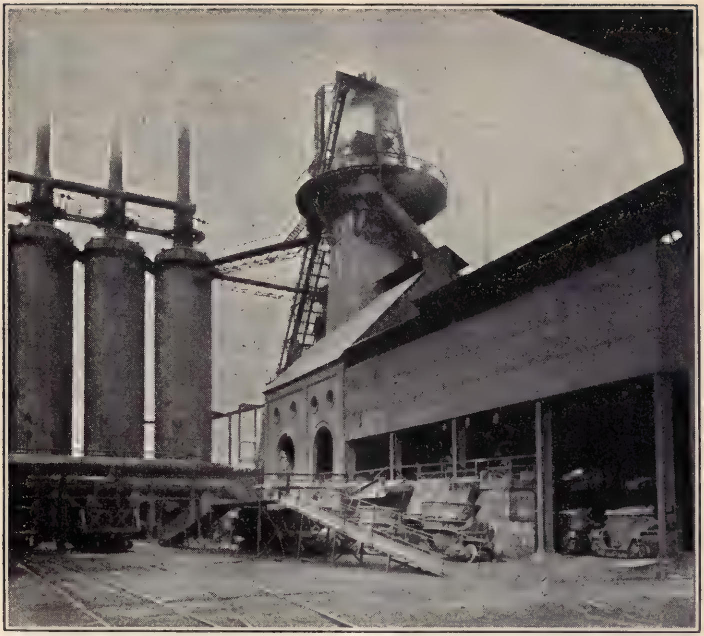
ful, and so far south that its winters are mild. We take a stroll under the old forest trees lining Peachtree Street, visit the house where Joel Chandler Harris lived when he wrote his story of Bre'r Rabbit and the Tar Baby, and then go out on the electric cars to see the soldiers drill at Fort McPherson. We visit also the battlefields where some terrible fighting was done during our Civil War.

Atlanta has railroads branching out in every direction, and we take a train which carries us in a few hours to Birmingham, Alabama. Birmingham is located on an old cotton plantation, but the city is more famous for making iron and steel than for raising cotton or the weaving of cloth. There is a mountain of iron right in the town, and the valley in which it lies has rich mines of coal. Near by are beds of limestone, so that the place has all the three important materials needed for the making of steel.

Indeed, it is said that steel can be made more cheaply in Birmingham than anywhere else in the world. We can well believe this when we see the huge mills covering acres, including blast furnaces as big around as a haystack and as high as a ten-story building. Some of the furnaces have a capacity of two thousand tons of pig iron per day.

During our stay we see but little more than the outside of the mills, preferring to leave our study of the making of steel until we reach Pittsburgh; for it is in and near that city that more iron and steel are made than in any other part of the United States, and perhaps of the world.

The southern states have many important minerals. There are deposits of iron and coal in the Appalachian Mountains of Virginia, North Carolina, Georgia, and Tennessee. The South has also rich deposits of phosphates, asbestos, and zinc. It has graphite and bauxite, the mineral from which aluminum is made. It has enormous water



Steel mill at Birmingham. The blast furnaces, at the left, turn the ore into pig iron.

powers and it will do more and more manufacturing as these are developed.

Traveling eastward from Birmingham, we cross Georgia and South Carolina, and make our next stop at Charleston to visit Fort Sumter, where the first shot was fired at the beginning of our Civil War. Charleston is built on a peninsula at the mouths of the Ashley and Cooper rivers, and the fort is on a little island at the entrance to the harbor not far from the shore. We take a boat and row out. The island is surrounded by brick walls eight feet thick and about forty feet high, and the grass-covered earthworks on the walls are still to be seen.

Charleston is one of the oldest cities of the United States. It has wide streets lined with old mansions, at the sides of which are broad lawns and gardens. Many of the houses were built in the days of slavery, and back of them the cabins occupied by the slaves are still to be seen. There are many colored people in and about Charleston, as everywhere else in the South.

After a walk down Meeting Street, we visit Citadel Square and ride out on the cars to the Magnolia Cemetery to see the live oaks draped with Spanish moss and the many beautiful flowers. Upon our return we take a stroll along the Battery, facing the sea.

Leaving Charleston, we go south to Savannah, a thriving cotton port long famous also as the chief turpentine and rosin port of the world. It is excelled in this respect to-day by Jacksonville, Florida, but we find its wharves are still filled with barrels of naval stores, as these things are called, awaiting shipment to Europe and other parts of the United States.

We have all seen turpentine and rosin. Turpentine is a liquid used in mixing varnish and paint. Rosin is especially valuable for varnish. It is employed also in shipbuilding and in the manufacture of munitions and paper and soap. Our school desks are probably coated with the juice of these pine trees, and from the same source comes the turpentine used in mixing the paint on this room. Rosin also waxes the bows of violins.

But suppose we visit a turpentine farm and see how turpentine and rosin are produced. Both of these things come from the sap of the long-leaf pine tree, and the farm is a forest of these trees. There are farms of this kind all along our south Atlantic coast from North Carolina to Florida, and farther west near the Gulf of Mexico to Louisiana.

In harvesting the turpentine crop, the workmen cut out holes or boxes in the trunk of each tree near the ground, and then scar the bark over it. The sap oozes out of the scarred places and drops into the boxes, where it forms a gum as thick as molasses. This gum is scooped out, put into barrels, and carried to a distillery. There the gum is melted and the turpentine passes off in a vapor through pipes kept cool by streams of cold water. As the vapor touches the pipes it condenses and turns to a liquid again and flows out as turpentine. The rosin only is left in the kettle. It has become thick by boiling, and when put into barrels it hardens. It is then ready for sale.

Turpentine distillery. The gum is melted in the building at the left. The vapor passes off through the pipe and condenses into turpentine.

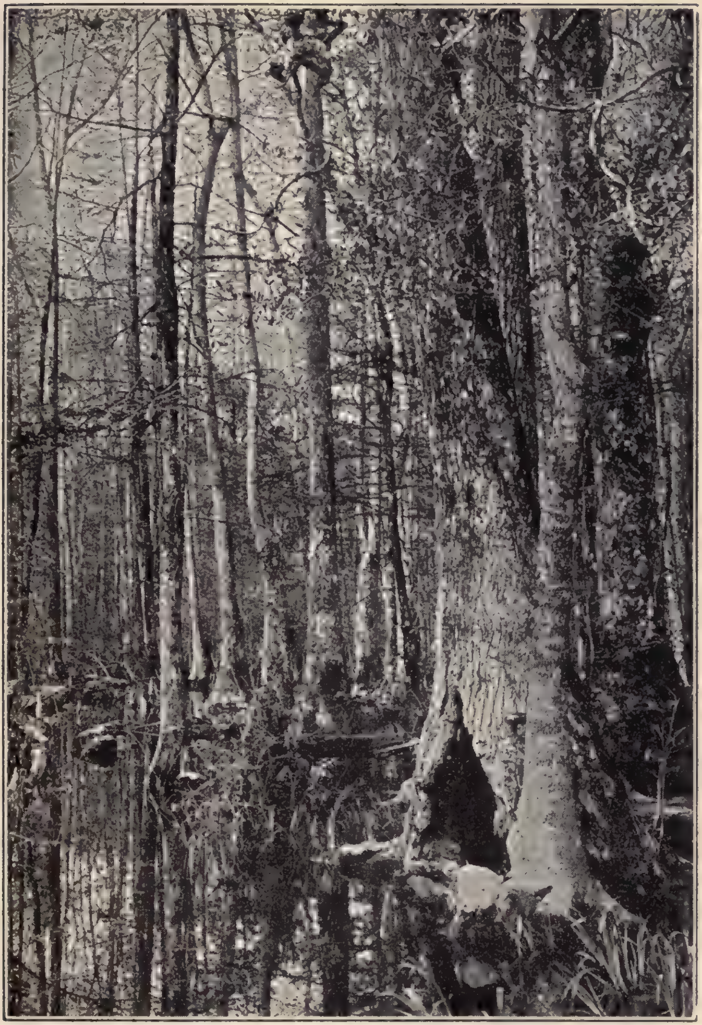
We are now on the eastern edge of the great pine forest belt which runs from North Carolina parallel with the coasts of the Atlantic Ocean and the Gulf of Mexico to eastern Texas. This belt is from sixty to more than one hundred and fifty miles wide, and it contains many millions of acres of valuable timber. Every few miles along the railroads through it there are sawmills where the trees are being sawed into boards, and upon the tracks are long trains of lumber of various kinds on their way to the cities of our eastern and central states.

The pine trees grow on the sandy soil of these regions where hard woods will not thrive. Hard woods are found only in the valleys and at the north higher up in the mountains behind the pine belt. Gum and cypress trees grow in the swamps.

The southern pines are of several well-known varieties. The long-leaf or Georgia yellow pine is used largely for floors and the inside woodwork of houses, and the same is true of the better grades of some of the other varieties of pines, such as the North Carolina and Virginia pines, and of the Cuban pines. We are told, however, that lumber is growing so scarce that trees of almost every description are now being cut, and as we see the great quantities shipped we wonder whether in time our woods will not all disappear.

The southern states have about two fifths of our standing timber, but there are now about eighteen thousand sawmills at work, and it is said that not many years will elapse before it is all cut away. The southern hard woods supply much of the oak and hickory used in the making of our furniture, airplanes, and automobiles.

Our travels over the railroads carry us for miles through the swamps, of which there are many throughout this part of the southern states. The Okefeno′kee Swamp of



Scene in Dismal Swamp, Virginia and North Carolina. About two thirds of the swamp has been reclaimed by drainage.

Georgia has regions like the jungles of tropical countries, and quagmires in which a horse or a man might sink out of sight. The swamps contain many kinds of snakes, and alligators by scores crawl through the muddy waters of those bordering the Gulf of Mexico.

1. Locate Atlanta. How far is it from New York? New Orleans? San Francisco?
2. What famous writer for children lived in Atlanta? Tell the story of Br'er Rabbit and the Tar Baby.
3. Locate Birmingham. Why is it a great steel-making center?
4. What is bauxite? Asbestos? Zinc? Graphite? Mention something for which each is used.
5. Locate Charleston. What famous historic event occurred there?
6. Point out some article of furniture in the schoolroom on which turpentine was used. What other uses has turpentine? From what region does it come?

XX. FLORIDA

WE begin our travels this morning in the land of flowers. The word "Florida," which means "Flowery," was given to this region by its discoverer, Ponce de Leon (pōn'thā dā lă-ōn'), who came here looking for an island which the Indians said contained the fountain of perpetual youth. He found Florida so beautiful that he called it the Island of Florida, not knowing it was a part of the mainland. Many years later, in 1565, the Spaniards founded St. Augustine, the first white colony on the mainland of the United States.

Florida was a Spanish possession for more than two centuries. It was a Spanish colony when our English colonies gained their independence, and it was not until 1819 that by a treaty with Spain it became a part of the United States. About that time Andrew Jackson, who afterwards became President, was commanding our soldiers in fighting the Seminole Indians, and he was made the first governor. The chief city of Florida, Jacksonville, was named after him.

Florida is one of the low lands of our country. It has no hills as high as the Washington Monument, and a great part of it is almost on the level of the sea. The state has thirty thousand lakes, and the Everglades in the southern part is a huge shallow fresh-water lake larger than Connecticut. It is filled with low, marshy islands and abounds in fish and wild birds of many kinds. Much of the marsh is now being drained and turned into orchards and farms. More than half the state is covered with forest, and it has some of the best woodlands of the South.

The soil of Florida is composed largely of lime and other material from the sea floor. In places it is underlain with beds of phosphate rock, which is among our most valuable fertilizers. The largest deposits of phosphates in the world are found here. Several million tons are sometimes mined in a year, and the rock aids our farmers greatly in increasing their crops.

Much of the land is sandy, with spongy limestone rock underneath. A part has been built up in the sea by the millions of coral polyps that live in the warm waters of this part of the world. In the southern part of the peninsula where the land drops out of sight the polyps are still at their work of world building. We see this in the many little coral islands poking their heads up through the waters and forming the Florida Keys, which end in Key West.

The climate of Florida is delightful. The state lies in the tropics, and in the winter it is warm when our northern states are covered with snow. In summer the heat is tempered by the breezes from the sea. This has caused many of our northern people to go to Florida to escape the cold winters, and some of them have made their homes there. Railroads have been constructed to take care of the visitors, and cities and towns have grown up. Had we time we might ride on the cars along the whole eastern coast of Florida, seeing fine homes almost all the way, and finally go out over the coral islands to Key West, which is only a few hours by steamer from Havana in Cuba.

The latter part of this trip we should make on a railroad built over the sea, the Keys forming the foundations in many blocks. About fifty of the Keys are inhabited, and the largest is thirty miles long. They are coral islets which extend in a curve from the end of the peninsula to Key West. The channels separating the islands vary in width from a few hundred feet to several miles. The water between is not deep, and concrete bridges or viaducts have been built up for the railway, seventy-five miles of which seems to rest, as it were, on the water. One viaduct is seven miles long.

Key West is an important place. It is a habitable island with a well-fortified harbor, commanding the entrance from the Atlantic Ocean to the Gulf of Mexico. Many people on the island are engaged in making cigars of tobacco brought from Havana over the way. Others catch turtles, and dive down for the sponges found in the waters near by. There are one hundred and fifty little sailing vessels in the sponge fleet, and they are always coming and going.

We have an excellent train from Savannah to Jacksonville, the largest city and chief seaport of the state. It lies on the St. Johns River, which connects it with the Atlantic.

Sponges, and bales of sponges, in a sponge warehouse.

We see ocean ships at the wharves and also side-wheel boats, upon which we shall travel up the St. Johns into the heart of the country.

After leaving Jacksonville, we steam for a long distance through what seems a great lake. The St. Johns has been called a little Amazon, and we see why as we go. The river, which rises in the southern swamps and flows north almost parallel with the ocean, is in many places more than a mile wide. It is lined with forests of palmetto, live oak, and cypress, the branches of which are loaded with Spanish moss. This moss is a sort of air plant which grows over the trees, hanging down from the limbs, and in some places almost reaching the water. Much of the earth along the banks is sandy. We miss the green turf of other parts of our country, and although our surroundings are beautiful we long for the velvety grass of the North.

We find, however, that every part of the world has its own beauties. The wild flowers of Florida include many that are grown in northern hothouses, and there are hundreds of semitropical plants not found in the other parts of our country. In some places we go through jungles so dense that we imagine ourselves in the hot lands of Africa. The air is soft and balmy in the evenings and mornings, but at midday the sun is so hot that we have to keep under cover.

We see curious birds on our voyage. Herons and buzzards fly about overhead; and long-legged cranes and big-throated pelicans stand in the mud on the edge of the river. Now and then an alligator scrambles down the muddy banks as it hears the noise of the boat.

The streams which flow into the St. Johns furnish excellent fishing. Florida is one of our best fishing grounds.

It is the home of the tarpon, our biggest fish that can be caught with a hook. Many a tarpon, if stood upon its tail, would be as tall as a man; and some have been caught which weighed more than one hundred and fifty pounds. Tarpon fishing requires a strong line. The sportsman often has to fight with the fish for hours; he lets it run with the hook this way and that until it is tired out and at last can be dragged to the boat.

Tarpon over six feet long, weighing 215 pounds.

All together, Florida has six hundred or more different species of fish in its waters. In addition to the tarpon, we learn that shad, mullet, mackerel, trout, red snappers, and even turtles and oysters are caught in large numbers and shipped to all parts of the country. Hundreds of fishing vessels are engaged in the work, and more than three million dollars' worth of fish has been taken from these waters in one year.

XXI. A VISIT TO AN ORANGE GROVE

AS we travel up the St. Johns we learn that this region is the chief winter fruit and market garden for supplying the cities and towns of the North. We see many orchards and gardens where trucking is done. Florida raises large quantities of early tomatoes, millions of watermelons and muskmelons, and about four million bushels of sweet potatoes a year. It gives New York and Boston their early strawberries, and produces also guavas, Japanese persimmons, and plums. It has many lime, lemon, and grapefruit trees, while its two leading fruit crops are oranges and pineapples.

We have to go some distance south to reach the best orange districts. There are oranges in all parts of the state, but in the north the fruit is sometimes spoiled by frost.

The orange orchard we visit lies on the banks of the Indian River. We have no trouble in getting a permit to see it. Oranges are as common here as apples are in New England, and the men tell us to go in among the trees and pick all we can eat.

How delicious the fruit tastes when fresh from the tree! It is more juicy than any we can buy in the stores. How full the trees are! Some are so loaded that the golden balls shine out everywhere through the emerald green leaves. Single trees sometimes bear as many as five thousand oranges a year.

We ask the owner of the grove to tell us how oranges are grown. He replies that the trees have to be planted and cultivated five or ten years before they come into bearing, and adds that certain trees have been known to be still producing fruit when more than one hundred years old.

The orange crop is important. We produce one third of

Strawberry pickers. Much of this fruit is sent North.

all the oranges grown in the world, and there are none more delicious than those of Florida and California. Hundreds of millions of oranges are eaten in the United States every year. We import some from Sicily, and also from the

West Indies, but our best oranges are from our own country.

In Florida also we have lemonade made from fruit fresh from the tree, and pick grapefruit, which we eat sweetened with sugar. Lemons and grapefruit grow much like oranges. The grapefruits are usually twice as large as a large orange; they are of a pale lemon color, and look beautiful as they hang on the trees.

In southern Florida we see many coconut groves and pineapple plantations. The coconut comes from a palm tree which thrives near the seacoast. It begins to bear when from nine to twelve years old, and a good tree may have as many as one hundred coconuts on it.

Pineapples grow upon the ground not unlike cabbages. They are planted during the months of July, August, and September, at which time slips or suckers taken from the old pineapples are set out in the ground about twenty inches apart. This is so close that ten thousand or more can be grown on one acre. If the plants are carefully cultivated, at the end of twenty months the fruit is ready to ship. The pineapples are often picked green and allowed to ripen while on their way to the markets. Those we eat here in Florida have ripened on the ground, and they are far more delicious than any we have ever tasted before.

Most of southern Florida is wilderness. One can ride for hundreds of miles in boats through the swamps, and one may have a shot at a bear, a wildcat, or a deer. When we go swimming we are always on the lookout for alligators, and we shall not be safe in some parts of the Everglades without guns in our hands.

1. By whom was Florida discovered? To whom did it belong before it came to the United States?

2. How far is Jacksonville from New York? How far is Key

Grapefruit in a Florida orchard.

Wharves at Mobile. The ships will carry away cotton, lumber, turpentine, and rosin.

West from New Orleans? From Havana, Cuba? (Map, frontispiece.)

3. What states border Florida on the north? What ocean on the east? What gulf on the west? What other great peninsula is in the United States? Compare it in size with Florida.

4. What valuable characteristics has the soil of Florida? What is much of the rock underneath? What little animals made it? What are phosphates, and for what are they used?

5. Make a trip to Key West. Describe the railway and tell what you see. Why is Key West important to the defense of our country?

6. Mention some of the chief products of Florida. What kinds of fruit has it? How are they grown?

7. What is the chief river of Florida? In which direction does it flow? Describe your trip on it. Why is it not safe to swim in some of the Florida waters?

XXII. ACROSS THE GULF OF MEXICO TO NEW ORLEANS — THE MISSISSIPPI JETTIES

WE shall now cross the Gulf of Mexico to the mouth of the Mississippi River and steam up that stream for about one hundred miles to the city of New Orleans. The Gulf of Mexico does not look large on the map, but its eastern and western shores are farther apart in places than are New York and Chicago, and the same is true of its northern and southern limits. The area of the Gulf is almost one fourth as great as that of the main body of the United States. Our best route will be north along the coast from Tampa to Mobile, and thence west to the mouth of the Mississippi and up the river to New Orleans.

We stay only a few hours at Tampa and Mobile. Both ports have excellent harbors, and they have a great trade in cotton, lumber, and naval stores, which are shipped to Europe and to the West Indies and South and Central America.

We enter the Mississippi River through the mouth known as the South Pass. The Mississippi has several mouths, into which the mighty stream divides in passing through its wide delta. The land here has been built up during the ages by the earth washings brought down by the river, and we find the stream so loaded with mud that it discolors the waters of the Gulf far out from the mouths of the river. It is estimated that the Mississippi brings down enough soil every year to make an island a mile square and several hundred feet high.

One might think this silt would so fill the channels that ships could not possibly pass. And so it would if the currents were not strong enough to carry the mud far out into the depths of the Gulf. As it is, the silt has built up great bars in front of most of the mouths, so that large vessels cannot make their way through.

Our steamer crosses one of these bars through the channel formed by the Mississippi River jetties. These jetties were constructed by Captain James B. Eads in order that the current might cut out and keep clear a channel from the deep waters of the Mississippi near New Orleans to the Gulf.

Captain Eads sounded the Gulf and found deep water just beyond the bars. He believed that if he could narrow the channel the current of water passing through would be swift and strong enough to carry its load of mud far out into the Gulf, and at the same time cut a deep channel through the bar. He laid his plans before Congress, and was given the money to carry them out. They proved a success, and there is now a channel several hundred feet wide and over thirty feet deep through which the big ships from the ocean can safely enter the broad Mississippi.

But what are the jetties, and how are they made? They are wide walls built up from the bed of the river on each side of the channel. They were made by driving long rows of piles or tree trunks down into the bed of the river, so that they formed two thick walls inclosing the channel and running from the end of the land through the water, across the sandbars, and on into the Gulf. The piles were driven into the mud to a depth of thirty feet so that the walls might be strong.

But piles alone were not sufficient. Closely built embankments were needed, but these had to be made in the sea. How do you think this was done? Captain Eads harnessed the river and made it do much of the work. He had his workmen cut millions of willows and tie them together into great rafts, which were floated in among the piles, and then loaded with heavy stones and gravel until they sank to the bottom. Other rafts were then floated just over these, and sunk the same way, until at last they had thick piles and walls of willows and stone on each side of the channel reaching far out into the Gulf of Mexico.

Then the silt-laden Mississippi, as it flowed through the willows and rocks, dropped enough mud to fill up the spaces, and thus solid walls were created on each side of the channel. By these walls the waters of the river are confined in so small a space that they keep moving and carry their burden of mud far out into the Gulf.

We pass many vessels as we sail through the jetties, and they increase in number as we come into the Mississippi and approach New Orleans. We go by steamers filled with bales of cotton and grain and other merchandise on their way to Europe. New Orleans is one of our chief cotton ports, and also one of the chief grain ports of the South. The grain is loaded from an elevator which covers many acres, and is two hundred feet high. The grain is taken from the cars or ships which bring it in from the farms at the rate of two hundred thousand bushels per day, and pumped into the storage bins of the elevator, from which it can be poured into the ocean steamers so quickly that a ship is loaded at the rate of one hundred thousand bushels per hour. This elevator was built by the state of Louisiana. In the state warehouse near by we shall see men loading corn.

As we move up the Mississippi we can see for miles over the country. In many places the land is lower than the surface of the river, and everywhere the land along the banks has been built up to keep back the water. The high banks are called lev′ees. Upon some of them orchards and gardens are growing.

Almost the whole of New Orleans lies so far below the level of the Mississippi that walls as high as a two-story house have been built to keep out the water when the floods come. For a long time there were but few spots in the city where one could dig without striking water within a few feet of the surface. The ground was soaked almost to the grass roots, and a big rain sent rivers flowing through some of the streets. The whole city seemed to float, as it were, on a swamp.

To-day the ground beneath New Orleans is kept almost as dry as a bone. An immense drainage system has been constructed, and the water flows off into low-level canals, from which it is pumped out into canals higher up, and in that way carried off into Lake Pontchartrain, whence it flows into the Gulf of Mexico. Formerly, there could be no cellars on account of the water, and in the cemeteries the graves were built above ground. It was difficult to make good foundations, and the city was squatty. To-day, it has many large buildings, although no skyscrapers such as we saw in New York.

But let us climb to the roof of the grain elevator and take a bird's-eye view of the city. We are high above the surface of the Mississippi, which winds its way in and out through the wide expanse of buildings below us, like a mighty yellow boa constrictor, and is lost in the green fields at the south. Looking more closely, we can see railway trains flying along, on two iron bands girdling the heart of the city. Those bands are the public belt railway, which enables the freight of many railways to be brought in and unloaded at the doors of the warehouses at very small cost. The belt line connects with every railway system that comes to this gateway of the ocean.

Now take your spyglass and sweep it around over the city. The old buildings are low on account of the water-soaked lands of the past, and it is only those near the river that are of great height. Back from the stream are beautiful homes of two and three stories, and in the old French quarter we see that the houses are crowded along narrow streets with galleries running from block to block.

The grain elevator upon which we are standing compares in size with those of Duluth or Chicago, and near it is the state cotton warehouse, which covers one hundred acres. It handles a million bales of cotton a year, and some day will be able to store one sixth of all the cotton raised in our country.

Coming down from the roof of the elevator we take automobiles and ride through the streets. New Orleans is much like a European city, and we hear many languages spoken as we stop here and there. The city first belonged to the French, and a little later the Spaniards owned the town and much of our country northwest of the Gulf of

Bales of cotton ready for shipment, at the New Orleans warehouse.

Mexico. At that time New Orleans was the chief Spanish town of the New World. Later still the territory again came into the possession of France, and in 1803 it was sold to us by the French Emperor Napoleon for fifteen million dollars. By that Louisiana Purchase, as it is called, we acquired most of the land between the Mississippi River and the Rocky Mountains. A great part of our future travels are to be in that region.

During our War of 1812 New Orleans was attacked by a British army of twelve thousand, which was defeated by General Andrew Jackson with six thousand Americans. The battle lasted only a short time, when the British fled, leaving about two thousand killed and wounded behind them.

In some parts of New Orleans there is as much French spoken as English. Let us visit the French market. It is not far from Canal Street, the chief business highway. Many of the marketmen are French, Spanish, or Italian, and those who are buying use a strange jargon in making their bargains. At some of the stalls vegetables are sold by the lot and not by the bushel, peck, or quart. They are arranged upon tables in piles, and each marketman fixes the price of his piles. The buyers take those they think are the biggest and cheapest.

Leaving the market we make a tour of the wharves. The water front is about forty miles long, and the municipal docks reach seven miles. The city has five miles of great warehouses, and its arrangements for handling cargoes are

Loading cotton for export. New Orleans is one of the chief cotton ports of the world.

as good as those of any port in our country. It has eleven trunk lines of railway, and the Mississippi system includes thousands of miles of navigable waters. Grain, cotton, and other products come in chiefly by rail, but some in river steamers and barges, and many ocean vessels are always going out through the jetties carrying these products to Europe. At the same time coffee, sugar, bananas, and other products are coming in from South and Central America, and we have to watch our steps to keep out of the way of the stevedores. There comes a huge motor truck loaded with cotton. It is driven by a burly negro, who sits high up in the air almost surrounded by the bales. Let us follow it and see how the pressing is done.

The truck goes through the narrow streets not far from the banks of the river and finally stops at the state warehouse. Here the bales are rolled off and weighed before pressing. Each bale now takes up about as much space as an ordinary kitchen table. It is as high as our shoulders and about three feet square. It has already been squeezed by the machinery of the plantations into as small a package as was possible without the use of the great cotton press.

There comes a bale now about to be pressed. The man wheeling it in has already cut the iron hoops with which it was bound, and the cotton swells out as though taking a breath of relief. It swells more and more as it is thrown into the huge iron jaws of the press. Now the engineer pulls a lever and the steel jaws move towards each other. They are operated by electricity, and the force is so great that the size of the bale is reduced to less than half what it was when it left the plantation. Then it weighed only fourteen pounds to the cubic foot and it now weighs thirty-four pounds. The iron straps are fastened around it as it lies in the press, and when it comes out it is ready to be stored away in the warehouse or taken to the hold of a steamer. Such pressing is necessary in order to increase the number of bales that can be stowed away in one shipload.

XXIII. A VISIT TO A SUGAR PLANTATION

HAVE you a sweet tooth? If so, you must be careful in your travels with us to-day. We are now in the hot, moist lands about the Gulf of Mexico, from which much of our cane sugar comes. In the western part of our country we make sugar from beets, and we also import beet sugar from Europe. We bring in cane sugar by the shipload from Cuba and the Hawaiian Islands, and we make some on the plantations here in Louisiana.

There are scores of such plantations within a few hours' ride of New Orleans, and we have an invitation to visit one of the largest. The plantation is so big that it has railroads to carry the cane from the fields to the factory, and it employs so many people that their houses make a large village. The buildings of its refinery cover several acres.

Leaving New Orleans, we pass through swamps whose trees are loaded with Spanish moss, and then go for miles through fields of tall sugar cane. Now and then we see the smoke of a huge mill streaming out against the blue sky, and at last we stop at the station on the estate.

The manager gives us horses for a gallop over the plantation before we look at the mill. There are roads through the fields, and we ride between walls of green cane. The leaves of the stalks rise above our heads as we sit on our horses. Some of the cane is fifteen feet high and the rows are so close together that were it not for the roads it would be almost impossible for us to make our way through them.

But before we go farther, let us stop and learn how the sugar cane is grown. The crop looks like corn, but the cane planting is not like corn planting. Corn is raised from seed grains, and it is planted in the spring. Sugar cane may be planted in either fall or spring; and instead of seed grains, little pieces of ripe stalks are laid flat in furrows that run from one side of the field to the other. The stalks are so laid that they fit close together, three being placed side by side, making three long rows or pipes of cane in each furrow. Next, the soil is thrown over the cane with a plow, and the planting is done. By and by, in the spring, sprouts start up from each joint of the cane, making long ribbons of green against the black soil. The sprouts grow rapidly, and by August they are as tall as a man. They continue to grow until the middle of October, when they are about twice as high as the average corn stalk and are ready for cutting. This is the height of the cane at the time of our visit.

We stay for a while at a place where scores of men and women are cutting the cane. They labor in squads under an overseer; and as they stand in the fields they face what looks like a solid wall of green. Each has a knife, which flashes in the sunlight as he cuts his way through the wall.

See how carefully they work! Not a motion is wasted. The sweetest juice is in the lower part of the cane, and for that reason they cut it off close to the ground. They also strip off the leaves and cut off the top of one cane before they go on to the next. After cutting, the stalks are thrown into piles ready to be taken in carts to the cars.

There is a loaded train ready to move. Let us jump on and go with it. On our way to the mill we cross large

Cultivating a field of young sugar cane in Louisiana. When full grown the cane will be twice as high.

canals. The plantation was at one time a swamp, and the land had to be drained before the cane could be planted. We have already learned how much work it takes to grow cane. We are now about to see the wonderful machinery required to get the juice out and turn it to sugar.

Our car stops at one of a group of large buildings. The cane is thrown off upon a moving belt which carries it to the top of the big mill, and drops it down upon two heavy steel rollers, each as large around as a hogshead and much longer. They have teeth much like those of an enormous file. As the cane falls upon the rollers, the teeth catch hold of it and pull it in between them, and their weight is such that the juice is squeezed out, so that when the cane comes out it is as dry as a last year's cornstalk. It is so dry that it burns readily and can be used for fuel. It falls upon a moving belt which carries it into the furnaces that run the mill.

But what becomes of the juice? Let us go under the rollers and see. It is pouring down from them in streams into a trough about a foot wide. We dip in our fingers and taste the liquid as it falls from the cane. It is so sweet it is sickening. It looks dirty, and reminds us of dishwater. Still, out of this sweet, dirty water the pure white sugar will come. But every bit of dirt must first be taken out, and it must be made as clear as crystal before it is boiled down into sugar.

The sweet liquid is first carried by pipes into large iron tanks, where it is bleached by running sulphurous acid gas through it. The gas makes it bubble, and a yellow foam rises to the top and is skimmed off. Lime is now put into the tank to settle the dirt and remove the acid. After several such processes, the juice becomes clear.

The sweet liquid is now ready for boiling. This is done

Sacks of raw sugar. The sugar will be refined and sent all over the United States.

How lump sugar is made. These cakes of sugar are being dried, after which they will be cut into small pieces.

in vats or tanks heated by coils of steam pipe. The liquid is skimmed as it boils. It flows from one tank to another, growing clearer and clearer, and thicker and thicker. Taste it now. It is the purest of sirup, and its color has turned to a light yellow.

Look at the sirup as it seethes in the tank! What an enormous amount there is of it! There is enough here to give the children of a whole state a taffy pulling. At the left is one big tank which contains forty thousand pounds of sirup, all boiling and seething in the process of being made into sugar.

Come with me now to that huge vat where the boiling has turned the sirup almost to sugar. The vat is twice as long as our parlor at home, and so deep that if we fell in we should be drowned in the mixture. Let us take up a spoonful. It is as thick as mush, and in fact is a mush of molasses and sugar.

It needs now only the centrifugal drying machine to take out the sugar. In this process the mixture is whirled round at great speed, being thrown against the fine meshes of the sievelike vessel in which it is placed, and the molasses passes through, leaving only the yellowish white crystals of sugar. This is raw sugar, ready to be packed up in bags or barrels and shipped to the markets.

In the larger refineries the purifying of the sugar is carried still further. The sugar water is filtered through tanks of charred bones ground to a powder. It is washed and filtered again and again and is heated in such a way that the sugar grains become pure white and all the same size.

The coarser sugars are not so carefully refined, but most of our fine sugar is made in this way.

But what becomes of the molasses? This word, as used in the refinery, means the refuse left after making the sugar.

It contains the poorest parts of the juice when all the sugar possible has been taken from it. Such molasses is different from that sold as sirup, which is made from the fine juice of the cane. The refuse molasses is so cheap that it sometimes brings as little as one cent a gallon. Then it does not pay to put it into barrels, for the barrels would be worth more than the molasses; and so it is carried to the markets in tank cars and sold largely in bulk. Much of it is used for feeding cattle and horses.

Leaving the sugar refinery, our next journey will be to see how rice is raised. The regions near by are noted for producing rice as well as sugar. Indeed, Louisiana raises more of this grain each year than any other state, its annual product being about twenty million bushels, or enough to give a pound of rice to two thirds of all the people in the world and leave some to spare.

Rice is one of the oldest of grains. It originated in India, and was eaten by the Chinese thousands of years before Christ. For ages it has been the chief bread food of Asia, and it takes the place of bread in the Philippines, the Dutch East Indies, and many other islands of the Pacific. Rice grows well in Siam, Burma, Egypt, and almost all other tropical countries. It was not produced in our country, however, before 1694. At that time a ship from Madagascar, loaded with rice, was driven by a storm into the port of Charleston, South Carolina, and the captain left some of the grain with one of the citizens, who planted it in a low place in his garden. A big crop was the result, and within a short time rice became one of the chief products of that part of the United States. The crop was first grown in the lowlands of the coastal plain in South Carolina and Georgia, and here and there along the shores of the Gulf of Mexico, but later large rice plantations were

Rice field, ready for cutting as soon as the water is drawn off and the ground is dry.

laid out in Louisiana, Arkansas, Texas, and California, and nearly all of our crop now comes from these four states.

The rice field which we visit is almost ready for harvest. As we come near the fields the yellow grain makes us think of wheat, but we see that the straw is different and that the heads are not at all like those of any grain raised in the North. The plants seem to grow in the water, and we are told that the best rice is raised where the ground can be flooded. The crop must have also the hot sun, and this land with its hot moist air and rich wet soil is just right for it.

As we go through the fields we learn how rice is raised. Mud walls or banks are built up about the fields to hold in the water. The land is broken up with gang plows drawn by horses or steam or gasoline tractors, and nearly everything connected with the crop is done by machinery. The seed is sown by means of drills, and then the land is flooded, the water being pumped in with steam engines that lift tens of thousands of gallons per hour. Within a short time the sprouts come out of the ground and poke their tiny green heads up through the mirror-like surface. The water remains on the fields until the rice is nearly ready for cutting. The straw is then yellow, and the heavy grains pull the heads over.

The water is drawn off, and the rice is harvested like wheat and oats. The stalks are cut and shocked in the fields, and then threshed to get out the grain. When oats and wheat are threshed the grain is ready for use. When rice is threshed, the process of preparing it for the market has only begun. Each little kernel has a hull, which does not come off in the threshing, but sticks as tight as though it were glued. Before the rice can be sold, the hulls must be removed. This is done by hulling machines. As the rice comes out of the machines it is rough, and most of it is rubbed and polished before it is sent to the market, although its food value is lessened by this process.

Some of our rice is raised on high lands without flooding. This is known as upland rice. It is grown in almost the same way as wheat and oats are grown in the North.

1. Locate the Gulf of Mexico. Compare it in size with Hudson Bay. The Great Lakes. The United States. What states border upon it?

2. Describe the Mississippi jetties and tell why they were built.

3. Locate New Orleans. Make a trip through the city and tell what you see. Why are cotton presses necessary?

4. If we had not made the Louisiana Purchase, what would be the United States of to-day?

5. Visit a cane sugar plantation and describe it. A sugar mill.

6. From what plants does most of our sugar come? Where is most of our cane sugar raised? (For further information about sugar see Carpenter's "How the World is Fed," pages 328–343.) What countries of the world lead in producing cane sugar? Beet sugar? (See pages 501, 502.)

7. Visit a rice plantation and tell what you see. How did rice first come to North America? Where are the chief rice lands of the world? (See page 501.) For what is rice used?

8. Trace a cargo of rice from Bombay to New York, by two different routes, going east and west. From Manila to New Orleans. In each case, how far does the rice travel? Over what oceans? Through what important canals or straits? (For further information about rice see Carpenter's "How the World is Fed," chapter 7.)

XXIV. THE SOUTHWESTERN STATES—A GREAT SALT MINE

BEFORE starting on our trip up the Mississippi River, we shall make a short run along the shores of the Gulf of Mexico through Louisiana and Texas, and then go northward into Oklahoma, returning by rail through

Arkansas and Louisiana to New Orleans. The four southern states west of the lower Mississippi are one of the most interesting parts of our country. They comprise more than four hundred and thirty thousand square miles. Louisiana is nearly as large as New York, Oklahoma is about twice the size of Indiana, and Arkansas almost as large as Illinois.

As for Texas, it is more than twice the size of the United Kingdom, larger than either Germany or France, and twice as big as the Italian peninsula. It is about as large as New England, New York, Pennsylvania, New Jersey, Delaware, Maryland, Ohio, and Kentucky combined. The state is so big that if it could be tipped up and turned over to the north, it would reach nearly to Canada; or if turned up with the Rio Grande as a base, and let fall towards the south, it would blot out most of the republic of Mexico. Tipped to the east a part of it would fall into the Atlantic Ocean, and to the west it would touch the Pacific Ocean.

These four states contain some of the best soil of the world. Louisiana leads all the states in the production of sugar cane and rice, and Texas leads all the states in its crops of cotton. Oklahoma and Arkansas are each rich in cotton and corn, and Texas has more cattle than any other state. At Fort Worth, its chief packing center, several million head of live stock are killed every year. The warm lands along the western shore of the Gulf of Mexico from the mouth of the Rio Grande northward to Galveston are a great winter garden from which tens of thousands of carloads of fruit and vegetables are sent every year to the cities of the North, and northern Texas and Oklahoma have large crops of wheat, much of which goes to Galveston for export to Europe.

This region has also huge forests of long-leaf pine trees, from which lumber is exported to Central and South America, and even to Europe. It has deposits of petroleum, sulphur, and salt which are unsurpassed by those of any other part of our country.

Leaving New Orleans on the Southern Pacific railway, we go westward over the lowlands which form a part of the delta of the Mississippi. We pass through sugar plantations where gangs of negroes are plowing the cane, and cross rice fields where the green plants seem to float like emeralds on the silvery water.

Our first stop is in one of the great bird homes of the world. During the winter enormous numbers of birds from the North fly to the warm marshes along the Gulf coast, where they feed for a season, making nests and raising their young. They inhabit the shores of the Gulf, and especially the islands near by which have been turned into bird reservations where nobody is permitted to hunt. There nests have been made for the birds, and they breed by the million. Some of them are so tame that they will eat from our hands.

Under the marshy lowlands along the coast of Louisiana and Texas lie some of the great salt beds of the world. The salt rock is below what are called islands, but are really huge mounds of earth rising a few feet above the marshy lowlands surrounding. These islands are often long distances apart, but they extend for hundreds of miles along the shores of the Gulf of Mexico. In some of them holes have been sunk with diamond drills to a depth of from five hundred to one thousand feet to learn the character of the deposits beneath. Under many of the mounds the salt beds are so thick that the bottom has never been reached. Texas has four mounds under which the salt is known to be more than one thousand feet thick, and there

Mine tunnels cut out of the solid salt rock.

Salt rock as it is brought out of the mine.

is one which the state geologist estimates to contain more than fifteen hundred million tons of rock salt.

The salt deposit which we shall explore is supposed to contain so much salt that if it all could be brought up and distributed among the people there would be a two-horse wagonload for every man, woman, and child in the world. The amount is two billion tons. The mine is situated under Avery Island, not far from the Gulf of Mexico, and about one hundred and twenty-five miles west of New Orleans.

Leaving the railway station, we climb a hill and come to the shaft house at the entrance to the mine. We enter the elevator, the bell rings, and we drop down the shaft into a darkness so thick it can almost be felt. Descending five hundred feet, we stop at a great tunnel lighted by electricity. The salt rock begins almost at the surface, and the shaft has been cut through solid salt.

The tunnel in which we now stand is cut through salt. The walls sparkle like diamonds under the electric rays, and the white roof seems to be frosted silver. We climb on a car and ride through the tunnel into the mine, passing chamber after chamber of enormous extent, all cut out of salt. The floors, walls, and ceilings are white, and we seem to be in a huge palace of snow. Some of the chambers are twice as large as a schoolroom, and their ceilings are as high as the roof of a six-story building. They were once solid rock salt, which has been blasted out, taken up the shaft to the surface, and there ground up, to be shipped to the markets. The floor is covered with salt and our feet sink down into salt almost to the shoe tops.

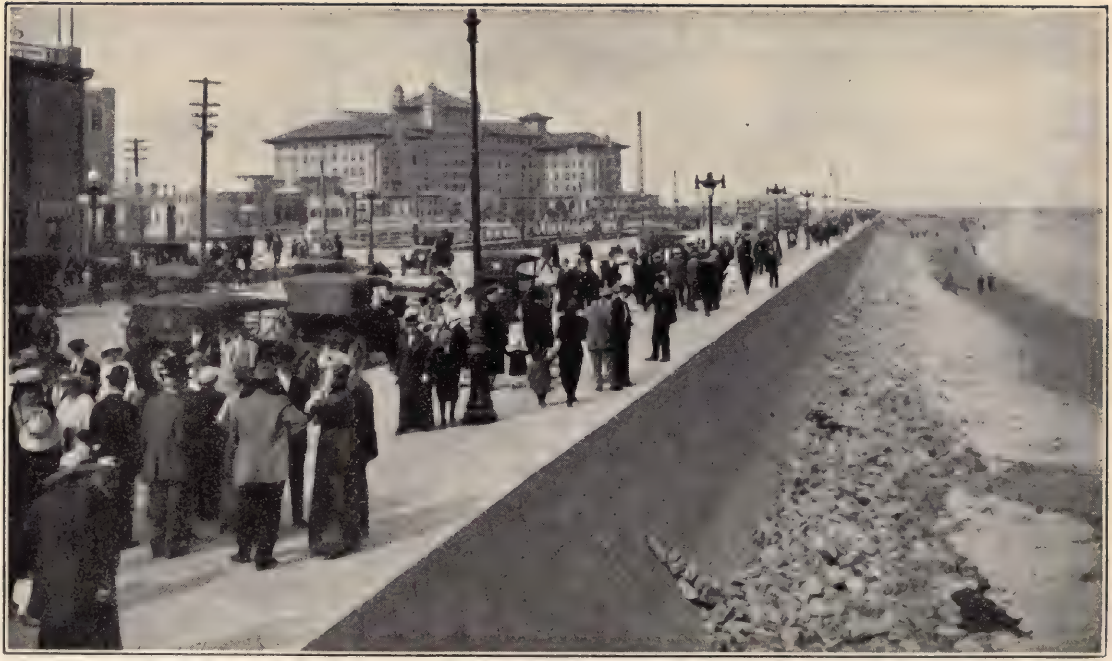
The roofs are upheld by pillars of salt, each forty feet thick. We stand beside one of these pillars and watch the miners at work. Many of them are colored, and their dark skins shine out in contrast with their brilliant surroundings. They are shoveling the salt into the cars, and starting it on its way to the shaft.

There comes a car now. It contains three tons of this glistening white rock. As we wait, we take out our knives and chip some lumps off the white wall. They look like pieces of quartz or rock candy. The salt crystals are of different sizes, some as small as a pea and others as large as our fists. Some of the blocks blasted out are so big that they must be broken with sledges before they can be loaded on the cars. We lick the lumps we have clipped off. They taste just like the salt we have on our tables, and we are told that this rock is almost pure salt.

As we continue our travels we shall find salt mines and salt wells in other parts of the United States. We have salt wells in New York and Michigan, and also in Kansas, Ohio, and elsewhere. The brine from these wells is brought to the surface and evaporated. A great deal of salt is obtained by evaporating water from San Francisco Bay, and in Utah there are millions of tons lying on the shores and in the waters of Great Salt Lake. We have so much salt, in fact, that we shall always have enough for our tables and plenty left over for cattle and for the many manufactures in which salt is used. One of the largest salt beds of the world outside the United States is not far from Krakow in Poland. We shall see it when we travel in Europe.

XXV. TEXAS — WE VISIT THE SULPHUR MINES

WE are in Texas this morning. Leaving the salt mines, we have visited the port of Gal′veston, where the sea is held back by a great wall; and then the thriving city of Houston (hūs′tun), and now we have come south to



Sea wall, 17 feet high, which protects Galveston from floods from the Gulf of Mexico.

Freeport, where the Brazos River flows into the Gulf of Mexico. Here is another huge mound somewhat similar to that under which we found the bed of salt. The mound is only twenty-three feet above the surrounding country, and at first sight it seems to be only a hill. It is a hill, but it crowns a treasure vault greater than the cave of Aladdin. Under the mound, far down below the surface of the earth, lie vast deposits of sulphur, from which large quantities of this mineral are taken each year. The sulphur-bearing rock is more than five hundred feet below the ground, while the men and machinery that do the mining are all at the surface.

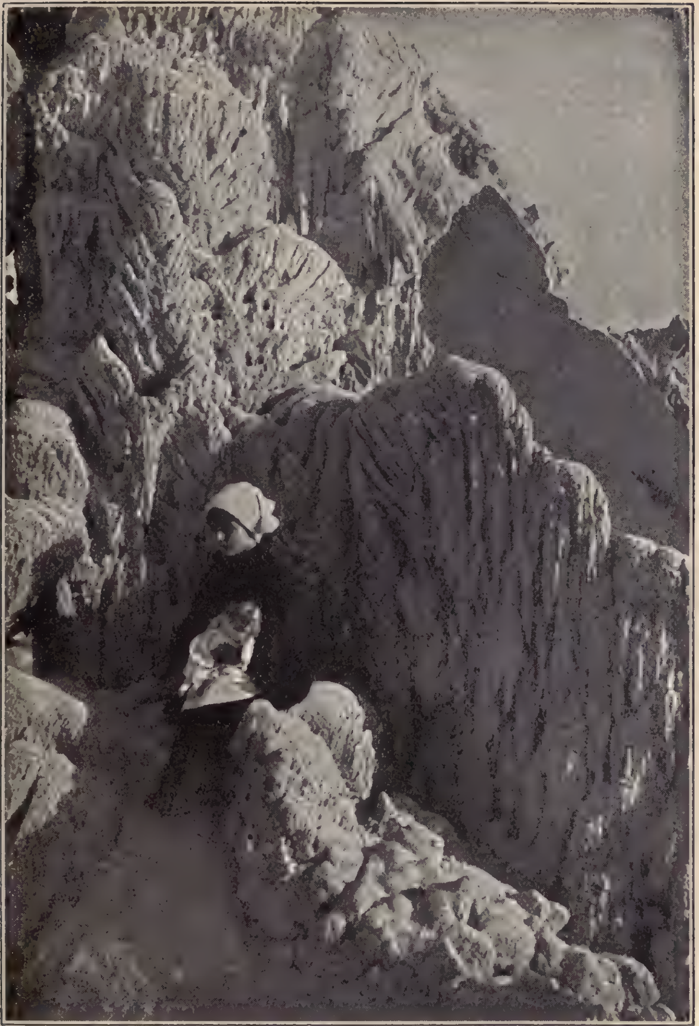
Before showing us how this can be, the manager of the mines gives us some information about sulphur and how it is brought from the heart of the earth and prepared for the use of man. He takes up a lump of the mineral. It is of a light yellow color and as hard as stone. When he touches a match to it, it gives forth blue brimstone flames, which make us cough, and remind us of Vesuvius and other volcanoes of which we have read.

The manager tells us that sulphur is employed in all high explosives, and that a large part of the ammunition used by our soldiers in the World War was made with the aid of sulphur found in these mines. He says that sulphur forms the basis of many of the fertilizers upon which we rely for our food supply, and that it helps to make one of the best sprays for destroying the insect pests of our orchards. It is used also in the bleaching of paper, and thus has a part in almost every newspaper, magazine, and book that is printed. The paper of this book is made from wood pulp, and sulphur was used to make the paper white enough for the printers. Sulphur is a necessity in refining petroleum, and it is employed also in refining sugar and in the making of rubber. Indeed, sulphur is used in so many different industries that we should find it hard to get along without it.

In the past most of our sulphur came from the island of Sicily. It was dug out from the slopes of Mount Etna, from deposits created by the eruptions of that great volcano. At the same time we were getting some sulphur from Japan and Mexico, all of which was taken either from the craters of dead volcanoes or from beds near by.

This was the situation when it was discovered that there was a great bed of sulphur, similar to the one here at Freeport, lying about five hundred feet under the marshy lands and quicksands along the Gulf of Mexico near Lake Charles in Louisiana. For a long time the people tried to mine this sulphur, but the ground was so marshy that they could not reach it by shafts. It lay there until a chemist named Herman Frasch conceived the idea of sinking pipes into the sulphur and forcing through them water so hot that it would melt the mineral, which as a liquid could then be forced by compressed air through other pipes to the surface. Frasch made many experiments, and as a result wells were drilled down into the sulphur rock, and huge hot-water plants and pumping plants were erected, by which the mineral thus treated was brought to the surface. The sulphur rock at Freeport is much the same as in Louisiana, and about the same processes of mining are used.

The manager of the mines takes us first to the hot-water plant. The great buildings are filled with huge boilers, which heat from eight to twelve million gallons of water a day. The fuel is petroleum, which is consumed at the rate of four or five thousand barrels every day. It is brought in tank steamers from the oil fields about Tampico (täm-pē'kō) in Mexico.



Hardened sulphur inside a bin. Most of the sulphur block has a smooth surface. This mound was formed under the pipe through which the liquid sulphur comes.

As we go by the boilers we are able to look into the furnaces and see the flames under them. The heat is so intense that the water is raised to one hundred and twenty degrees above the boiling point. It is then pumped down into the ground through pipes at a pressure of two hundred and fifty pounds to the square inch.

Leaving the hot-water plant, we go to the place where the sulphur is pouring forth from the earth into a walled inclosure covering about one acre. The walls are of thick planks, and they are built higher and higher as the sulphur pours in. Just now they are as high as our heads.

We climb up and look in. The inclosure is half filled with a bed of light yellow sulphur, and from a pipe over the center is flowing a stream of boiling liquid which looks like clear cider. It is sulphur that has been melted in the bed five hundred feet below, and then forced up through a pipe. The liquid is so thin that it spreads easily over the yellow mass. As it cools it hardens and becomes solid sulphur like that lying beneath. It was in this way that all the sulphur inside the inclosure was built up from the floor.

As the liquid continues to flow, the surface of the sulphur bed will continue to rise, and the walls of plank about it will be built higher and higher until they are forty feet from the ground. When this inclosure is filled, the plank walls will be taken away and put around another inclosure, into which the sulphur will pour. The mass of sulphur remaining will then be a huge block the color of a canary bird when fresh from a bath. It will have a base of an acre, the height of a four-story house, the cubic contents of a large office building, and will weigh tens of thousands of tons. All this will be pure sulphur, and it will have only to be blasted down by dynamite, and loaded by steam shovels on the cars waiting to carry it to the ships in which it is sent to the markets. There are several of these yellow blocks near the one we see in the process of making, and from some of them the sulphur is now being shipped.

The beds of sulphur at Freeport are said to cover about five hundred acres. Together with the deposits in Louisiana, they supply so much sulphur that we now produce almost all we consume, and are able to export this mineral to other parts of the world.

1. What four southern states lie west of the Mississippi River? How large are they? Compare each in size with your own state.
2. Compare the area of the four states with that of the United States. Compare Texas with the United Kingdom. With Germany. With France. With New England.
3. Name the chief products of these states. Trace on the map the route of a shipload of fruit from Galveston to the city of New York. How far does it travel?
4. Why do birds come to Louisiana for the winter?
5. Describe your trip through a salt mine. Mention other parts of the United States where salt is produced. Trace a shipment of salt from Avery Island to your home.
6. Write a story of a pinch of salt, telling where it comes from and how it is used. Let the salt tell the tale. (See Carpenter's "How the World is Fed," chapter 47.)
7. Locate the sulphur mines of Texas and Louisiana.
8. Name some of the uses of sulphur. Tell how sulphur is mined in Texas. In Sicily. (See Carpenter's "Australia and the Islands of the Sea," page 311.)

XXVI. OUR GREAT FIELDS OF PETROLEUM

BEFORE making our next journey let us find out about another valuable product that lies far down under the ground. This is petroleum. The name comes from two Greek words meaning rock oil, for petroleum is really an oil from the rock. It lies in beds of porous rock in most cases a quarter of a mile or more below the surface of the earth. Sometimes there is gas above the oil, and sometimes water below it, but the oil, gas, and water are held down so tightly by the mass of denser rock overhead that they cannot get out. Indeed, the pressure is often so great that when wells are bored down through the rock overhead, the oil and gas burst forth in a terrible explosion, sending the heavy tools and other machinery used for drilling high into the air and creating a fountain of oil that sometimes extends to a height greater than that of the highest building in the city of New York. If the flow is not checked by putting a cap over the pipe, the well covers all the surrounding country with petroleum. The oil coats the streams, and the cattle will not drink the water. It soaks the ground and sprays the trees and plants with a coating of grease.

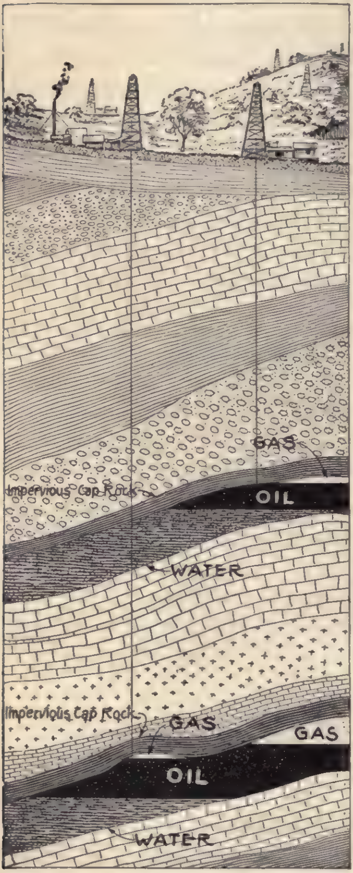
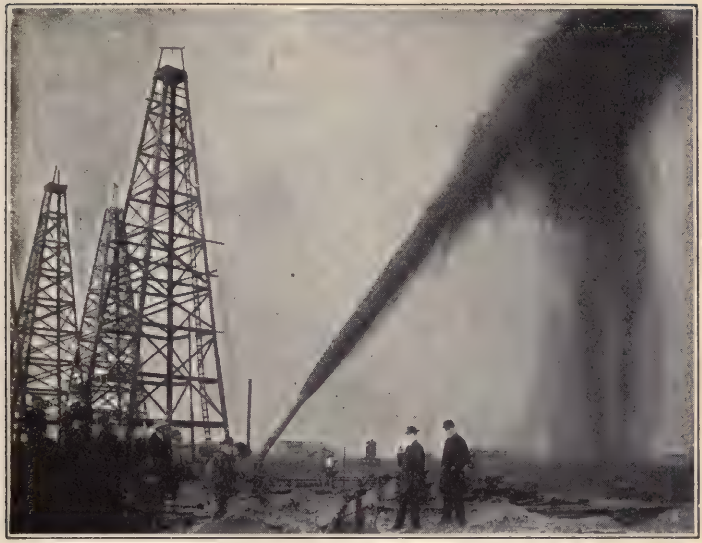


Diagram showing layers of rock, two of which contain gas, oil, and water.

Some years ago one of the richest oil wells of the world



An oil "gusher." The pressure is so great that the petroleum is sent hundreds of feet into the air. Derricks like those at the left are used in drilling the wells.

was struck near Tampico in Mexico, not far from the Gulf of Mexico. The oil gushed forth so rapidly that it soon reached the fire of the engine, and the great fountain became a mass of flames fifty feet wide and more than a thousand feet high. It made such a bright light that it was seen by ships in the Gulf one hundred miles off, and newspapers could be read at night seventeen miles away. That well was struck on the fourth of July, and it was the greatest fourth of July celebration on record. The oil burned for two months at the rate of from sixty thousand to seventy-five thousand barrels per day, and when the fire was put out the oil flowed forth so rapidly that a reservoir a quarter of a mile long was made by banking up the earth near by to contain it. This great well was later surpassed by one near Tuxpam (tōōs′päm), Mexico, which yielded one hundred and sixty thousand barrels of petroleum a day. In other wells the pressure is not so great, and in some the oil has to be pumped to the surface.

The history of this wonderful product is very interesting. Petroleum was known to the ancient Greeks, Romans, and Persians, but it was not used commercially until oil wells were drilled in our own country about the time of the Civil War. Before that the only artificial light came from candles of tallow or wax, or little wicks of cloth or fiber floating in saucers of lard or sperm oil. This was so even in the oil regions, where now and then little pools of petroleum had seeped forth and lay upon the surface of the ground. About the only use of this oil was as a medicine. The Indians used it for rheumatism and sore throat, and to make their hair grow. But the farmers thought it injured their land, and one man who lived in the Pennsylvania oil country sold his farm and moved to Canada because the oil spoiled the drinking water for his cattle. When men began to drill oil wells, that farm brought a fortune.

It was near Titusville, Pennsylvania, that the first oil well was bored. That was in 1858. The man who made the experiment was Colonel E. L. Drake. He thought that the oil on top of the ground proved that there must be a great quantity of oil below. When he reached the depth of sixty-nine feet, the petroleum gushed forth at the rate of thirty-five barrels a day, and when other wells were sunk near by, more and more oil came forth. It was found that the oil could be refined and used for lighting. Lamps were made for it, and a great business sprang up in producing and refining petroleum. It was soon found that the real source of the oil was much farther down, and the depth of the wells was gradually extended until there are now many that go from a quarter of a mile to more than a half mile below the surface. There is an oil well in West Virginia which is more than a mile deep.

As new uses for petroleum were created, men traveled all over the world looking for oil, and new fields were discovered. Since then we have found petroleum in so many different parts of the United States that we now produce about two thirds of all the oil that comes from the earth. In 1918 that one product was worth as much as all the gold and silver mined by the whole world in that year; and since Colonel Drake sank his first well we have taken out about eight hundred million tons of petroleum from the wells of the United States. This is enough, at forty tons to the car and forty feet to each car on the track, to fill a solid train of oil cars six times as long as the distance around the world at the equator.

Next to the United States in the rank of oil producers, come Mexico and Russia, and after them the Dutch East Indies, India, Persia, and some territory in Europe at the foothills of the Carpathian Mountains. Some petroleum has been found in Canada, some in Peru, Colombia, and other parts of South America, and a little in Egypt; but so far as is known a large part of the oil of the world lies in different parts of the United States.

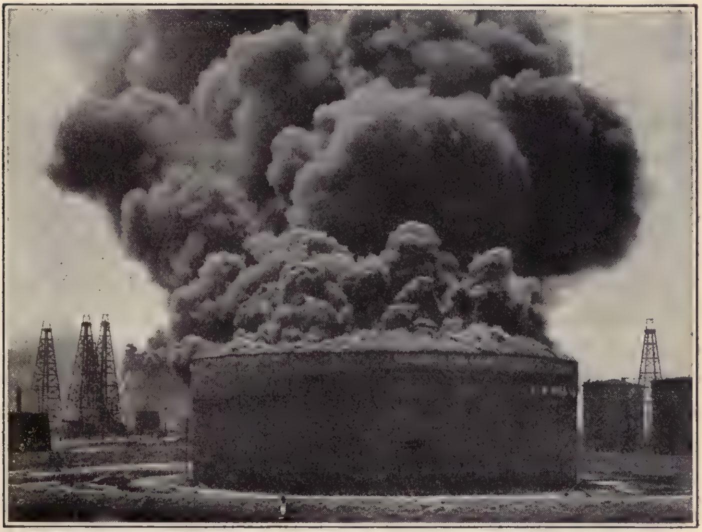
Our petroleum is found here and there from the Appalachian Mountains, where oil was first discovered, to southern California on the edge of the Pacific Ocean, and from the Gulf of Mexico to far-off Alaska. We have ten valuable oil fields. The Appalachian field takes in New York, Pennsylvania, southeastern Ohio, West Virginia, Kentucky, and Tennessee. The Lima-Indiana field is in western Ohio and eastern Indiana, and the Illinois field is in the southern part of that state. Going westward we find the Mid-Continent oil field in Kansas and Oklahoma, and then come the fields of northern Texas and northern Louisiana and those of the Gulf, where we are now. In the Rocky Mountains we have another oil region comprising parts of Wyoming, Montana, Colorado, Utah, and New Mexico, and there is also a rich field in southern California, where as much as one hundred million barrels have been taken out in one year. The Alaska field has not been developed, but that territory has places where the petroleum oozes out of the ground, and it is thought it may have rich oil deposits.

XXVII. TRAVELS IN THE OIL REGIONS — HOW KEROSENE AND GASOLINE ARE MADE

LEAVING Freeport, we motor back to Houston and find oil being taken out within a few miles of that city. We travel northward, passing other oil wells, and enter Oklahoma, which is one of the chief oil-producing states of the Union. The city of Tulsa, which in 1900 was only a village, began to grow as soon as petroleum was discovered near by. It now has tens of thousands of people with fine homes, and office buildings ten or fifteen stories in height, all founded on oil. Here we visit the wells and tank farms, and then move southward through the oil fields of Arkansas and Louisiana until we reach Port Arthur, Texas, where are great oil refineries almost on the shores of the Gulf of Mexico.

In this long journey we have been able to see how petroleum is brought forth from the depths of the earth and transported to the refineries where it is prepared for the uses of man. In an oil field, wells are drilled to find just where the petroleum lies and to bring it to the surface. Except by drilling no one can tell where the oil is, and many wells are bored which give no oil at all. In others the oil does not flow without pumping.

Taking care of the oil is one of the great problems of our oil supply. It is carried away from the wells in pipes which run along the surface of the ground to huge steel tanks, one of which may hold as much as fifty thousand barrels or more. From the bottom of these tanks are other pipes, some of which run for hundreds of miles to refining centers on the seaboard or elsewhere. Great pipe lines connect the oil fields of Oklahoma with the Atlantic sea-



Fifty thousand barrels of petroleum on fire near Beaumont, Texas.

board by way of Illinois, passing through one oil field or another until they reach the ocean. Other pipe lines run from Oklahoma to Port Arthur and to Baton Rouge (băt′un ro͞ozh′). A vast network of pipes connects the Appalachian fields with the Great Lakes and the Atlantic Ocean.

The pipes used to carry the oil are of iron. They range in size from two to twelve inches, but the most common sizes are from six to ten inches. Along each pipe line at intervals from fifteen to thirty miles are pumping stations where powerful pumps force the oil onward. The crude petroleum is transported also in tank cars, but most of such cars are used in moving the oil after it has been turned into kerosene or gasoline, or fuel or lubricating oils. For transportation by sea, tank steamers are largely used, and the petroleum is sometimes pumped from the wells directly into ships which carry it to the refineries.

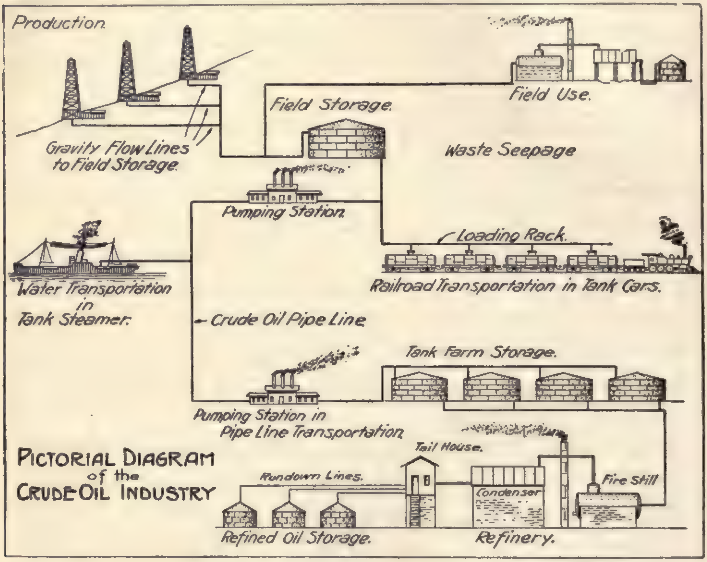
A large part of the crude petroleum produced in the southwestern states comes in pipes to Beaumont (bō′mŏnt) and Port Arthur. It is stored here in tank farms, great collections of steel tanks which store the oil until the refineries are ready to use it. These farms are generally elevated above the refineries, with which they are connected by other pipe lines so that all that is necessary is to open the pipes and let the oil flow to where it is needed.

Before we go through the refineries, we should know something of the most important things they produce. The raw material is this crude petroleum, and the manufactured goods are the gasoline which runs our automobiles and gas engines; the kerosene which still makes a large part of the light of the world; the fuel oil which runs the greatest ships of our navy and merchant marine and moves the trains on many of our railroads; and the lubricating oil which forms the grease that helps the industrial world to go around. One does not often think of lubricating oil as an important product of petroleum, but it is used in every kind of machinery from the tiniest wrist watch to the biggest steam engine. It is necessary for every locomotive and dynamo, for our woolen and cotton mills, and for our airplanes, battleships, and submarines. In addition are the minor products of petroleum, such as benzine, vaseline, paraffin, road oil, and asphalt. Indeed, so many things are made by the refineries that we cannot mention them all.

But here we are at the refinery. It is one of many situated near Port Arthur, within a rifle shot of the Gulf of Mexico and at what might be called the spigot of the pipe lines which pump in tens of thousands of barrels of petroleum from the great oil fields of the Southwest every day. The plant we visit covers hundreds of acres, and over a thousand acres more are hidden by oil tanks. It is much like a city, as it is divided into blocks and streets along which the refining goes on. Some of the buildings are filled with stills, where the oil is heated to a vapor and then passed through cold water to condense it into separate products. Other streets are lined with ovens as high as a two-story house, and some of the ovens are so large that a train of cars could be run through them and not touch the walls.

Here and there is a tank farm in the heart of the city. The tanks are of different sizes. The large ones are for fuel and lubricating oils, and the smaller ones for kerosene and gasoline. Each is connected with pipes which run to the port so that almost any product of the refinery can be put into the ships by pumps or by gravity. The kerosene and gasoline tanks are painted white. This is that they may not absorb the rays of the sun, which in this semitropical climate might cause an explosion. Sometimes a tank catches fire. The oil bursts forth in great quantities of flame and smoke, and blazing rivers of fire flow over the landscape.

Going through the refinery, we follow the crude petroleum through the many processes necessary to fit it for the various products. The work is largely one of distilling.



PICTORIAL DIAGRAM of the CRUDE-OIL INDUSTRY

The oil is heated and part of it is turned into a vapor which is sent through coil after coil of pipes bedded in huge vats of cold water. As the vapor touches the cold pipes it condenses and flows out as a new product. The oil is then heated further, and another part is vaporized and condensed into another product. The new products may be heated more gradually and distilled again into products more carefully separated.

Kerosene is distilled to make gasoline, and the gasoline also is refined before it is ready for sale. During these processes the oils are washed again and again with soap and water to take out their impurities.

In making lubricating oil the petroleum is run through hot water and cold water, and in the making of paraffin the oil has to be frozen as well as boiled. In some of the processes the petroleum and its products are treated with chemicals, including sulphuric acid, made from such sulphur as we saw mined at Freeport.

During our trip through the oil fields, we have passed towns whose streets seemed to be filled with torchlight processions. A second look showed us that the torches are stationary, and that each is a round black pipe out of which comes a waving flame. This flame is produced by the natural gas that flows from the depths of the earth. It comes from the rock hundreds of feet below the surface of the ground. Such gas is common to the oil regions, and there are usually great quantities of gas on top of the oil as the two lie in the earth.

Men drill for this gas much as they do for oil, and the gas may pour forth from a well for months and years before it stops. Natural gas is used for lighting and heating, and also as a fuel for manufacturing. Gasoline also is made from it. We are now taking natural gas out of twenty-three states, and those which produce the most are West Virginia, Oklahoma, Pennsylvania, and Ohio.

1. What is petroleum? Tell the story of the first oil well, and compare it in depth with the oil wells of to-day.

2. Where are the chief oil fields of the United States? Of the world? How does the United States rank among them?

3. Name the principal methods of transporting petroleum. What is a tank car? A tank farm? A pipe line? A refinery?

4. What are the most important things we get from petroleum? Mention some of the uses of each. For what is paraffin used? Vaseline? Asphalt?

5. If petroleum should suddenly be taken away from the world what would happen?

6. Visit a great refinery and tell what you see.

7. Describe natural gas and give some of its uses.

XXVIII. UP THE MISSISSIPPI TO ST. LOUIS

WE have come from Port Arthur to New Orleans by train and are now beginning our tour of the fertile Mississippi valley, which comprises about one third of our country.

Our first travels through it will be by steamer in order that we may get some idea of the mighty river. We could go by train, for the vast region is covered by a network of railways, and the commerce of the valley is now carried chiefly on the cars rather than by boats. In the past, the river had hundreds of steamers, boats, and barges, and a great part of the merchandise that went up and down the valley was carried that way. To-day nearly everything goes by train, and it is only certain of the heavier commodities and the products of the principal cities on the river that are carried by water.

We find a steamer leaving New Orleans for St. Louis, and take passage. Within a short time, the great port is lost to view and we are winding our way up this mighty stream, the longest river of the world.

The first thing we do is to try to get some idea of the Mississippi system. We go to the chart room, and the captain shows us his maps. As we look at them we see that the system may be compared to a huge tree, with its roots in the Gulf of Mexico and its branches reaching out into many of our central states. We can pick out the Missouri, which flows into the main stream near St. Louis, and as we trace the latter river to its source we find it is much longer than the Mississippi proper. Indeed, the system should be called the Missouri-Mississippi, for the Missouri is its fountain head, having its source in the Rocky Mountains more than a mile above the sea. From that point to the Gulf of Mexico the distance, by the windings of the river, is more than forty-two hundred miles, making the stream far longer than either the Nile or the Amazon, the longest rivers of other continents.

The Mississippi proper rises in Lake Itas′ca, not far from the borders of Canada. It winds its way in a crystal stream through numerous lakes to Minneapolis, where it drops down over the falls of St. Anthony, giving the motive power that grinds much of the wheat of the United States into flour. From there to St. Louis, where the Mississippi flows into the muddy Missouri, the distance is less than seven hundred miles, and the river is navigable from St. Paul all the way to the Gulf. Many of the tributaries of the Mississippi-Missouri are navigable. Indeed one might cross the Atlantic Ocean from New York to Liverpool five times and not go as far as he could sail on this river system.

Our steamer makes us think of a floating house of three stories. The lower stories are filled with freight, and above them are the sleeping and dining rooms. The hurricane deck is the yard where we play and stroll about, watching the scenes on the banks. We are moved along by the great paddle wheels at the sides of the boat, which the steam engines keep going day and night.

How green and beautiful everything is!

Mississippi River steamboat loaded with cotton. At New Orleans, the cotton will be reshipped.

At times we are sailing through forests of cypress trees, loaded with Spanish moss. The trees are so bound together with vines and dense vegetation that they form green walls on each side of the wide, yellow river. The only living things we can see are the birds which hop from branch to branch, and now and then a few people at the clearings, where little farms have been cut out of the woods.

Now the Mississippi widens, and we seem to be traveling through a series of lakes. We pass swamps and float by fields of sugar cane and cotton, in which many colored people are working.

Now and then we stop to take on or leave freight and passengers at the cities and villages on the banks. Rough-looking men and boys, most of them colored, load and unload the steamers. They sing as they work, making a great noise as they roll the huge packages and bales down the gangplank.

At Vicksburg we stay for some hours. Here are elevators on the banks of the river, and bales of cotton, barrels of flour, and bags of grain are rolled down into the steamers which ply between here and New Orleans. All kinds of things are brought to our steamer, and among them hundreds of crates of chickens to be sold in St. Louis. Each crate is just high enough for the chickens to stand up inside it. They poke their heads out of the slats, and squawk complainingly at us as the men carry them upon the boat.

On the way to Memphis we pass occasional steamers loaded with cotton, going down to New Orleans. Memphis is the most important city on the river between the mouth of the Ohio and New Orleans. It is famous as a cotton and lumber market. It has many railway trunk lines, and steel bridges here cross the river. Memphis is situated on a bluff overlooking the Mississippi at a place where the

Indians used to paddle across in their canoes before our country was settled.

How the Mississippi winds in and out as it flows on its course! From Cairo (kā′ro) to New Orleans it is like an enormous snake, only more crooked than any snake could possibly be. Mark Twain, who was once a Mississippi pilot, said that if somebody should pare an apple so as to leave the whole peeling in one long strip, and should throw the peeling over his shoulder, as it fell on the floor it would look much like the lower part of the Mississippi River. As our steamer winds around through the curves, we see other boats sailing to the right and left in the winding current above and below us; and there are places where we can get off upon the land, and walk across the fields a half mile or so, and there wait for the steamer, which has to go a dozen miles around to reach the same point.

As we make our way onward, we notice that banks, or levees, have been built up on each side of the river to keep the water from running over the land. There are eighteen hundred miles of such levees, on one side or the other. It has cost many millions of dollars to build them, and every year Congress gives a large sum to protect the land along them and to improve the navigation of the Mississippi.

Are the levees strong enough to make the people safe from floods?

Yes; sometimes, but not always. The Mississippi is hard to control. It is always changing its course, always wearing off the land in some places, and piling it up in others. It seems to be ever looking for a weak spot where it can break through. The least crack is soon enlarged by the water flowing through it, and if not stopped at once, the water will pour out over the land.

The moment a break is discovered the people rush out to fill it. They drive down stakes on each side of the crack, and put bags of earth between them. They take boats and throw all kinds of stuff into the break, in order to stop the stream before it can make the hole larger. If the break becomes ten feet wide, the water dissolves the bank as though it were sugar. It cuts through the earth like a knife and when the break has reached a width of a hundred feet or more, the banks drop down in slices half an acre in thickness, and the muddy river rushes with a loud noise over the country.

At such times farms are often swallowed up; and thousands of acres become lakes and ponds. When the cattle, horses, and sheep see the waters advancing, they run to the higher places, but sometimes they starve before the river subsides or the people can come in boats to take them away. Houses are torn loose by the floods and one may sometimes see buildings, with families on the roofs, floating down the river. The woodpiles on the banks are carried away, and large trees torn up by the roots are borne rapidly along by the current.

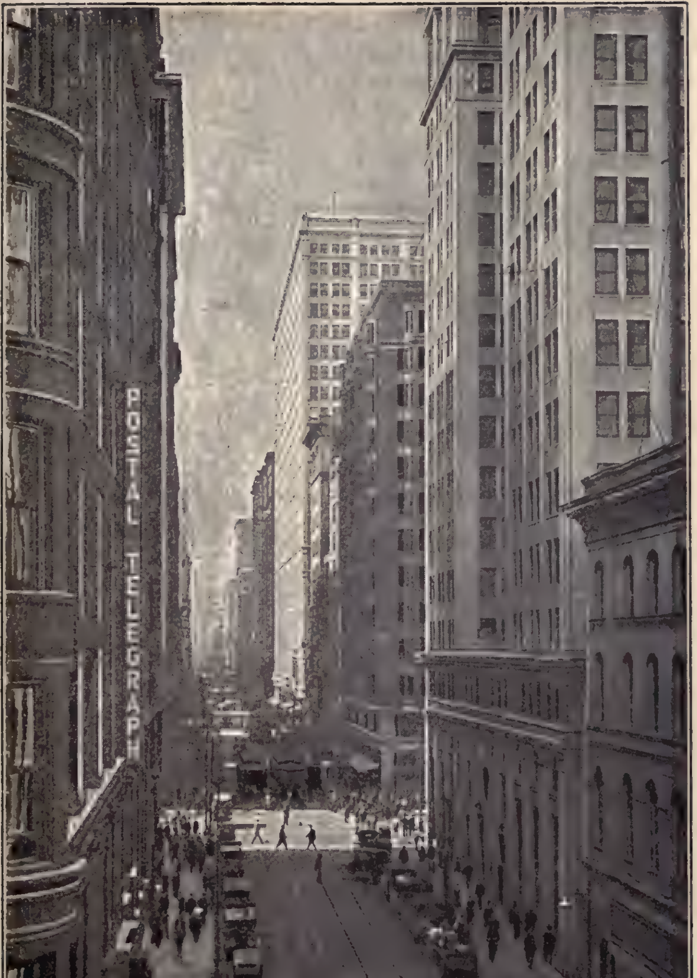
On our voyage up the Mississippi we are stopped now and then by the ships and barges coming down. We pass long rafts of lumber from the Red River and the upper Mississippi. They have little houses upon them, in which the lumbermen live during the voyage.

There are huge barges loaded with produce, fastened together in blocks, and pushed by steamboats behind them. There comes a steamship now, shoving along a half-dozen huge barges piled high with coal from the mines of Pennsylvania. Notice how she puffs as she forces them onward. The barges are fastened together in pairs side by side. Each barge is as long as a city lot and almost as wide. It is as deep as from the floor to the ceiling of an ordinary room, and if we should imagine our schoolroom packed full of coal, we may have an idea of the amount that each of these great flat boats is carrying down to New Orleans.

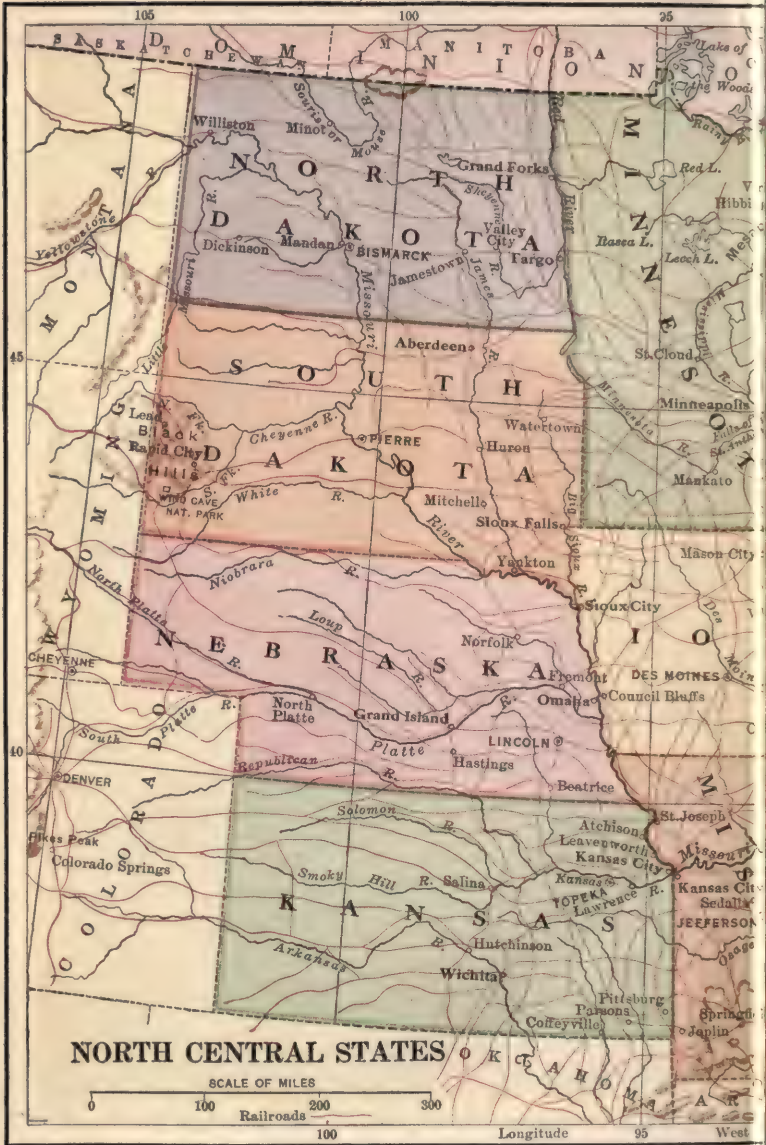
As we approach the city of Cairo we meet many barges of coal which have come through the Ohio River from the coal fields of West Virginia, Pennsylvania, and Ohio, most of them having been loaded at Pittsburgh. The Ohio River may be called the coal chute for the cities of the lower Mississippi valley. It brings much of the coal that makes steam for the factories of Cincinnati, Louisville, and the cities on the lower river.

Leaving Cairo, we steam northward through a rich farming country and soon reach St. Louis. This city is the most important of all upon the Mississippi River. It is one of the chief commercial and manufacturing cities of the United States, and it has a great trade with all parts of the lower Mississippi valley. St. Louis is situated on a limestone bluff on the west bank of the river. It is about seven hundred miles from New Orleans, six hundred miles from St. Paul, and about twenty miles south of the mouth of the Missouri. The town was laid out by Frenchmen and named St. Louis in honor of King Louis XV of France.

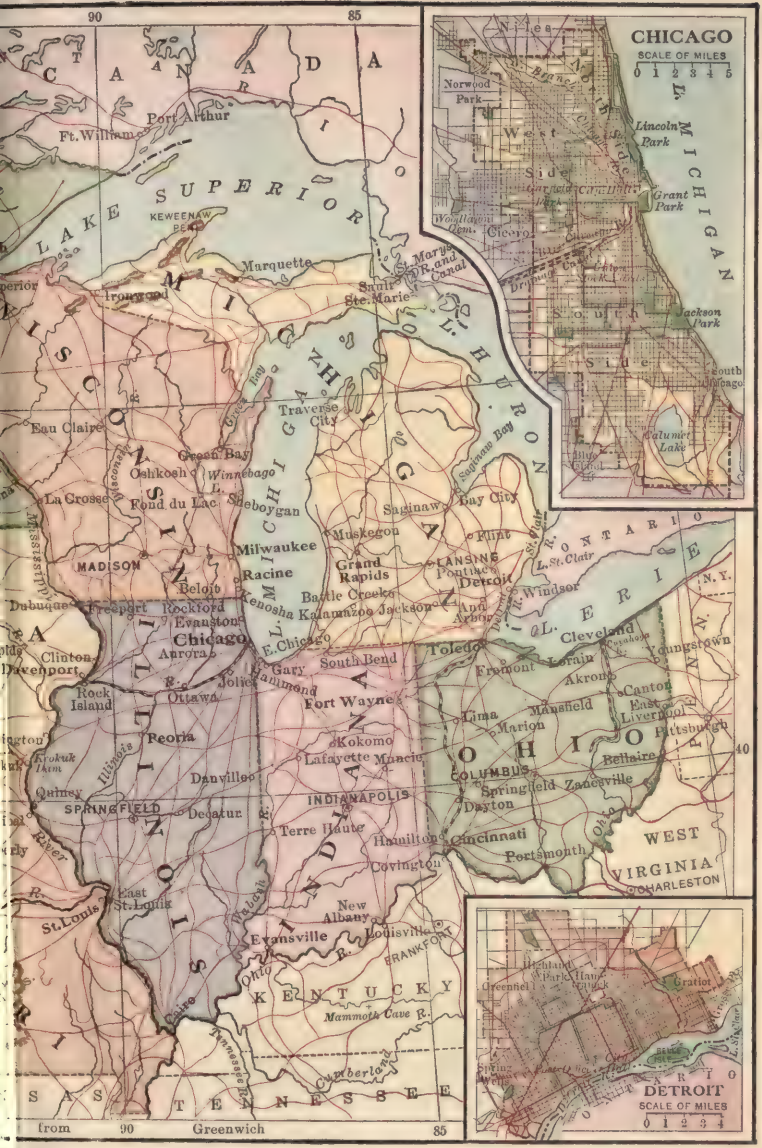
It is the situation of St. Louis that has made it important. Lying on the Mississippi between the mouths of the Missouri and the Ohio, it was an excellent place for trade, because goods could be easily shipped from it to all points on the Mississippi and its tributaries. As railways were built, it was found that the situation was equally good for a great railway center, and to-day many of the trunk lines between the East and the West pass through here. The city is one of the railroad gateways to Mexico, and much of our trade with that country passes through it. Other railways reach to every part of the United States.



Street in St. Louis. There are many tall buildings like these.



NORTH CENTRAL STATES


CANADA
ONTARIO
Port Arthur
Ft. William
LAKE SUPERIOR
KEWEENAW PEN.
Marquette
St. Marys R. and Canal
Sault Ste. Marie
Ironwood
MICHIGAN
WISCONSIN
L. MICHIGAN
L. HURON
Saginaw Bay
Green Bay
Traverse City
Eau Claire
Green Bay
Oshkosh
Winnebago L.
La Crosse
Fond du Lac
Sheboygan
Wisconsin R.
Mississippi
Saginaw
Bay City
Muskegon
Flint
Milwaukee
Grand Rapids
LANSING
Pontiac
Detroit
MADISON
Racine
Beloit
Battle Creek
Kenosha
Kalamazoo
Jackson
Ann Arbor
Windsor
L. St. Clair
St. Clair R.
Detroit R.
L. ERIE
Dubuque
Freeport
Rockford
Evanston
Chicago
Aurora
E. Chicago
Gary
Hammond
South Bend
Toledo
Fremont
Lorain
Cleveland
Cuyahoga R.
Youngstown
Akron
Canton
N.Y.
PENN.
Clinton
Davenport
Rock Island
Ottawa
Joliet
Fort Wayne
Lima
Mansfield
East Liverpool
Marion
Pittsburgh
Peoria
Kokomo
OHIO
Bellaire
Keokuk Dam
Illinois
Lafayette
Muncie
COLUMBUS
Springfield
Zanesville
40
Danville
Quincy
SPRINGFIELD
Decatur
INDIANAPOLIS
Dayton
Terre Haute
Hamilton
Cincinnati
WEST VIRGINIA
CHARLESTON
Portsmouth
Ohio
ILLINOIS
INDIANA
Wabash R.
Covington
East St. Louis
St. Louis
New Albany
Louisville
FRANKFORT
Evansville
Ohio R.
KENTUCKY
Mammoth Cave
Cairo
Tennessee R.
Cumberland R.
TENNESSEE
ARKANSAS
90
85
from
Greenwich
CHICAGO
SCALE OF MILES
0 1 2 3 4 5
Niles
Norwood Park
North Branch
Chicago R.
North Side
West Side
Lincoln Park
L. MICHIGAN
Garfield Park
City Hall
Grant Park
Woodlawn Cem.
Cicero
Drainage Canal
Union Stock Yards
South Side
Jackson Park
South Chicago
Calumet Lake
Blue Island
DETROIT
SCALE OF MILES
0 1 2 3 4
Highland Park
Hamtramck
Greenfield
Gratiot
Grosse Pointe
L. St. Clair
BELLE ISLE
Spring Wells
City Hall
Detroit R.
ONTARIO

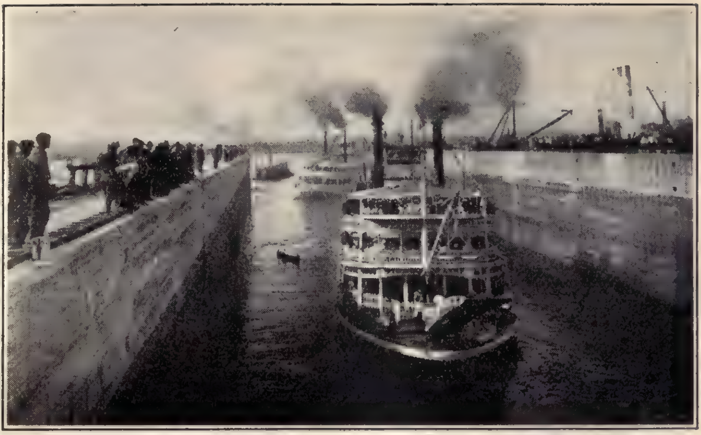
During our stay in St. Louis we visit the Union Railway Station, a fine building which, when it was built, was one of the finest of the world. We take automobiles and motor about through the parks and enjoy a trip through the residence section noted for its beautiful gardens and yards.

XXIX. HARNESSING THE MISSISSIPPI — THE KEOKUK DAM, AND FALLS OF ST. ANTHONY

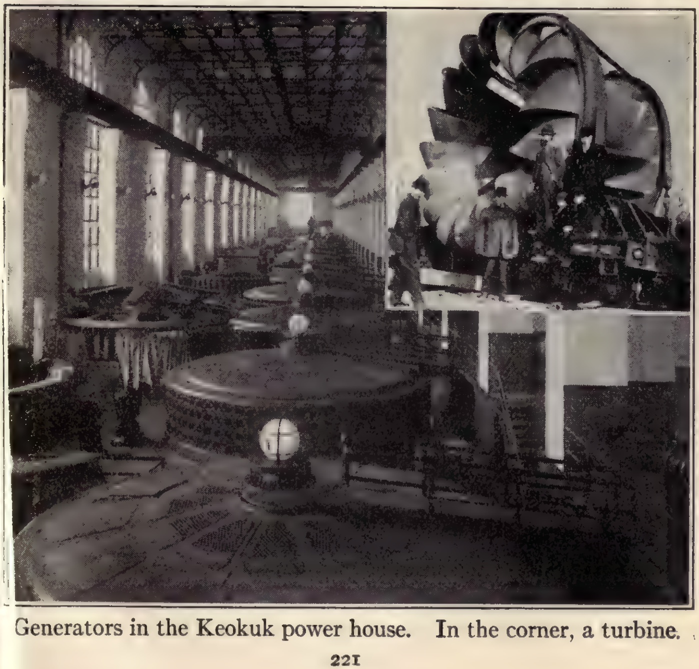
WE shall continue our travels on the Mississippi to the city of Ke′okuk, Iowa, where the river furnishes the power for one of the largest electric plants of the United States, and then go by train to different parts of the corn belt, which contain some of our best farming regions.

Leaving St. Louis, we pass many towns and villages on the banks of the river. The country is well settled, and the people are prosperous. About twenty miles north of St. Louis we pass the mouth of the Missouri, and see the yellow muddy waters of the latter river mixed with the clear stream of the Mississippi proper. The colors of the two rivers are very different, and they flow for some distance side by side before they are mingled.

As we go on up the river we pass many islands, and wind in and out among beautiful patches of green. Some of the islands are covered with willows, and others have maples and oaks. The largest have small farms upon them. The channels separating many of them from the nearest bank of the river have been so filled in with silt that at times of low water the islands appear to be part of the mainland. There are six hundred such islands between St. Paul and St. Louis, many of them two or three miles long.



Our steamer passing through the canal around Keokuk Dam.



Generators in the Keokuk power house. In the corner, a turbine.

Shortly before reaching Keokuk we stop at Hannibal, Missouri, where Mark Twain spent his boyhood. The captain points out a hill where Tom Sawyer and his boy friends used to dig for treasure, saying there is a cave near by in which Tom Sawyer and Huckleberry Finn planned some of their notable adventures.

At Keokuk our steamer passes through the canal built to carry vessels around the great dam, by which the power of the river has been harnessed and made to work for man. The dam gives a fall of twenty-three feet, the river pouring down at the rate of five hundred thousand cubic feet per second upon huge turbine wheels. Each turbine is whirled around with such force that the dynamo connected with it generates electric power able to do as much work as a line of two-horse teams twelve miles in length. The horse power already developed is more than two hundred thousand, and there is one hundred thousand horse power more that may yet be developed. The power thus created is sent by means of cables of copper wire to many cities and towns. Some of it goes to St. Louis, more than one hundred miles away. It runs the street cars of that city, and we are told the connection is so delicate that whenever a car stops in St. Louis the fact is registered at Keokuk.

While our steamer is going through the locks of the canal, we get off and take a walk along the great dam. It is the longest in the world excepting the dam at Assuan (äs-swän′), which holds back the Nile in order that Egypt may have a regular water supply throughout the year. The Keokuk dam is built of concrete, and the flow of the water is regulated by gates which can be raised and lowered to allow the river to go through or to be held back at will. When the gates are closed the water backs up so that it forms a lake one hundred and forty miles long.

Passing through the power house, we enter the room containing the dynamos in which the electricity is generated. Each rests over a well at the bottom of which is a turbine wheel whirled around by the waters of the Mississippi pressing upon it. The foreman describes the machinery. He tells us that the cable which carries the electricity over the country consists of nineteen copper wires twisted together. It is a half inch in diameter, and it is carried across the country on steel towers as high as an eight-story building, and so connected with the ground that they are protected from lightning.

We shall find other large power plants along the river, especially at the falls of St. Anthony in Minneapolis, where the Mississippi pitches down over falls and rapids amounting to eighty feet in one half mile. From this descent, more than forty thousand horse power has been developed, and additional locks and dams are being made below the falls which will double this power. Even then it will not be one third as great as that which can be developed here at Keokuk.

1. Compare the Mississippi River in length with the other great streams of North America. (See Table, page 495.) With the Nile; the Amazon; the Volga.

2. What are the two chief sources of the Mississippi-Missouri? Which is farthest away from the mouth?

3. Describe our steamer and our trip to St. Louis. Mention some of the goods shipped on the river. Trace a coal barge from Pittsburgh to New Orleans. What cities does it pass?

4. What is a levee? Why is it necessary?

5. Locate St. Louis, Memphis, and Vicksburg. Compare St. Louis with ten other large cities of the United States. (See Table, page 494.)

6. Where is Cairo, Illinois? Cairo, Egypt? Pronounce the two names.

7. Who was Mark Twain? What are some of his works?

8. Describe the Keokuk dam. Tell why it is important to St. Louis.

XXX. IN THE CORN BELT

WE are now in the heart of the corn belt. From St. Louis for many miles to the northward, the Mississippi is lined on both sides with great tracts of corn, and we can travel north and south or east and west for hours on fast railway trains without coming to the end of the cornfields. This region furnishes such a large part of the food supply of the United States that we decide to ride out on the cars into the country to see something of this wonderful crop.

We have now left Keokuk and are riding across the country between walls of green stalks, the leaves of which rustle in the wind made by the train as it flies through them. When our cars pass over an embankment above the fields, we look out of the windows over a sea of green and gold spotted with feathery tassels. The corn is turning yellow and the fat ears have husks of a lemon hue.

The crop is now ready for harvest. The corn was planted last spring. The ground was first plowed and harrowed, and marked out in rows. Three or four of the little grains were dropped in each hill where the rows crossed, and were covered with earth. The plants soon came up through the soil and grew rapidly under the warm sun. The fields were cultivated and kept free from weeds, and now each stalk of ripe corn is about twice as high as our heads. We can see the men in the fields cutting the stalks. They are putting them into shocks; later on they will strip off the husks and carry the ears to market.

Let us get down from the train and walk through the fields. We pull off one of the ears and look at it. We have in our hands the most wonderful food grain known to man. It is a grain which belongs to our continent, for corn was

A young corn club member in a field of corn ready for cutting. The stalks are three times as tall as he is. The ears, covered with husks, may be seen on the stalks, about midway of their height.

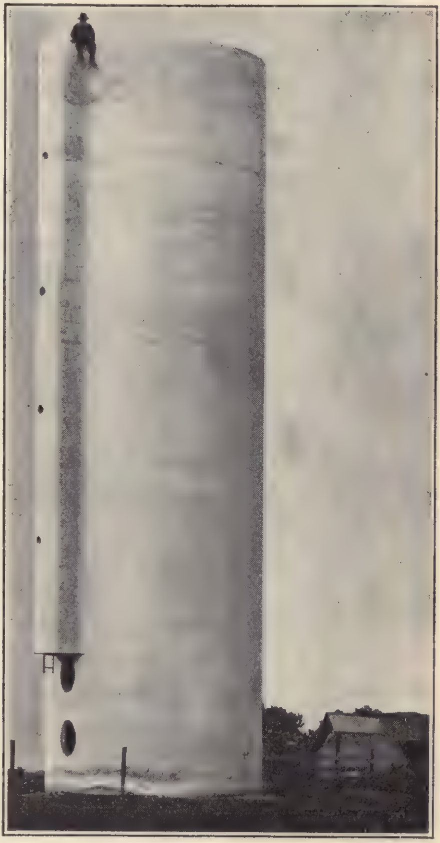
not known in Europe until America was discovered. Now count the kernels upon this single ear. There are about eight hundred. Some of the ears have over nine hundred and a few one thousand or more. Think of a mother who has nine hundred children. The parent-grain sometimes produces even more than that, for there are often two ears on one stalk.

Pick out one of the kernels and bite it open. How hard it is and how white its inside! If you should place it under a microscope, you would see that it is composed of thousands of cells, each containing starch and other material good for food.

Corn is one of the best of foods for both man and beast. We grind it into meal for bread, mush, and cakes. We make hominy and other breakfast foods of it, and the fine cornstarch that is used in puddings. It forms the chief food of our farm animals, and we consume it also as pork, mutton, and beef, and in geese, ducks, and chickens. When we eat our turkey at Thanksgiving and Christmas we are really consuming a part of the corn crop. Much of our sirup and sugar comes from corn, and almost all of our starch. We use corn husks for mattresses; and the leaves and stalks are fed to horses, cattle, and sheep. The whole plants cut green, chopped in small pieces, and kept in silos, are the chief food of our dairy cows, and so we have corn again in our cream and milk and in butter and cheese.

Indeed corn is more valuable than any other crop of the United States. The amount we produce in one year is sometimes more than three billion bushels of shelled corn, and it sells sometimes at such a price per bushel as to be worth two or three billion dollars. This sum is twenty or thirty times as much as all the gold we mine in one year, and three or four times as much as all the gold and silver which has been taken out of the whole earth in any year since the world began.

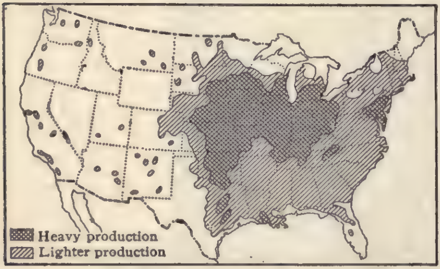
Think of the mass or mountain of corn that three billion bushels would make if it could be collected together! We can appreciate it better by loading it upon wagons. We shall put eighty bushels, or about two tons, in each wagon, which would be a good load for a team of horses. We shall try to load the whole crop in that way, and shall allow each team and wagon forty feet on the roadway, putting the noses of the horses at the tailboard of the wagon in front of them. How far away will the first wagon be when the last bushel is loaded? Suppose we start here at the Mississippi River. Would it be at Pittsburgh on the other side



Concrete silo of the most modern type.

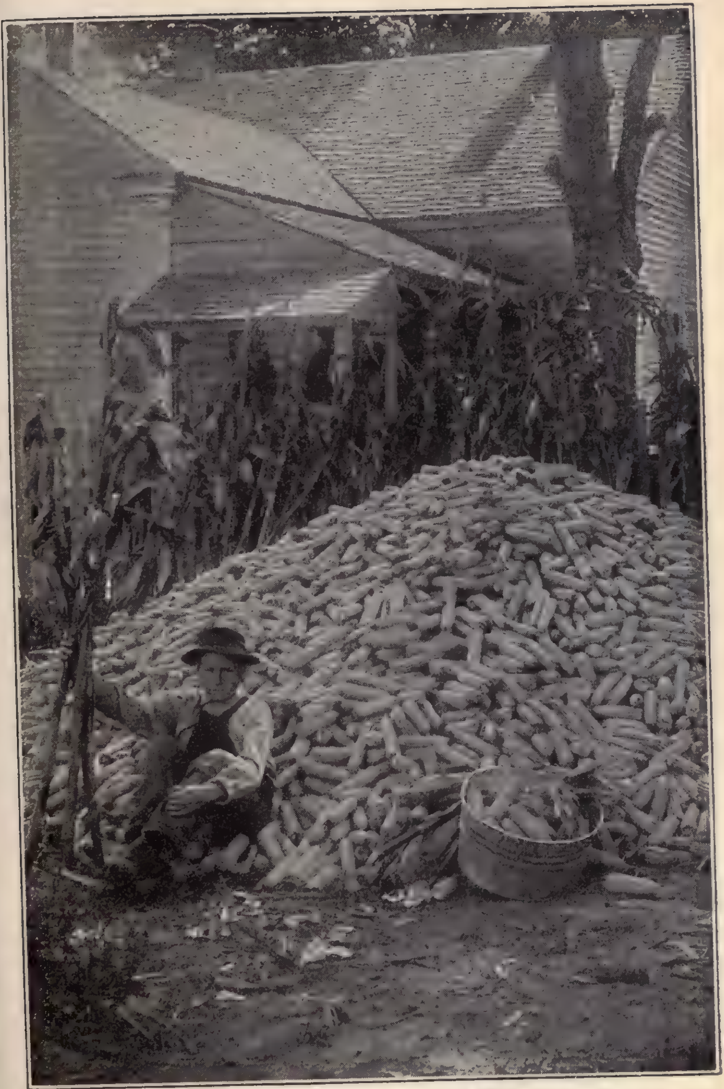
of the Ohio? No. In Boston, on the coast of the Atlantic? No. If we could bridge the ocean, would it be in Paris or Berlin? No. The caravan of wagons would extend far beyond that. It would reach on over Russia; it would cross Siberia, go over the Pacific Ocean and come back to the Mississippi valley where we are now. Even then not one tenth of the mass would have been loaded. The whole crop would require a train of wagons more than three hundred thousand miles long. If the train could travel through the skies, it would reach farther than from the earth to the moon.

Our country produces three fourths of the corn of the world. Of the remainder, some is grown in Mexico and Argentina, and some in Europe and Asia. Three fourths of our product comes from what is known as the corn belt, a region which stretches from central Ohio to central Kansas and from Kentucky to Wisconsin. Among the best corn states are Iowa, Illinois, Nebraska, Indiana, Ohio, and Missouri, but there are thirty other states in each of which the crop annually amounts to two million bushels or more.



Corn-growing regions.

The corn belt is one of the richest farming districts of the world. It is for the most part prairie with a soil so free from stones that the land can be farmed by tractors, and the rows kept clean by cultivators which will till both sides of one row, and often two or three rows, as they go over the fields. This region is the great fattening place for



This South Carolina boy raised 228 bushels of corn on one acre.

our live stock. It contains about one half of the hogs of the United States and almost three fourths of the cattle intended for meat. It is in the shape of meat that much of our corn is exported.

As we travel through the corn belt we shall now and then meet farmers' boys who belong to the corn clubs. Great as the corn crop is, it is said that it might be doubled and trebled if the best seeds were used and the planting and cultivation properly done. In order to raise more and better corn our Department of Agriculture at Washington has encouraged the boys to form clubs, each member of which tries to see how much corn he can produce on one acre of ground. The department sends the directions for planting and growing and the rules for judging the crop. The boy of each club who raises the most and best corn gets a prize.

There are thousands of these clubs scattered throughout the corn belt and especially throughout the southern states, and many of their members have raised three or four times as much corn as is grown in the fields all around them. The average yield in our country per acre is seldom much more than twenty-five bushels of shelled corn, but many of these boys of ten, twelve, and fourteen years of age have each raised more than one hundred bushels of corn on one acre of ground. Jerry Moore of South Carolina grew two hundred and twenty-eight bushels, Ben Leith of Georgia raised two hundred and fourteen bushels, and Bennie Beeson of Mississippi, two hundred and twenty-seven bushels of corn on one acre of ground. Junius Hill of Alabama grew more than two hundred bushels on an acre at a cost of less than nine cents per bushel, and his corn crop sold for more than one dollar per bushel.

In many places the bankers, merchants, and others club together and give the prizes. One Oklahoma boy won a gold watch in that way. An Indiana boy won a bicycle, and many boys have received prizes of trips to Washington for their work in the corn clubs. One boy made enough out of one crop of several acres to buy an automobile, and nearly all of the members have been successful in raising better corn than their fathers, who did not select the best seed nor cultivate after the rules of the Department of Agriculture.

In the same corn region there are many pig clubs, each member of which raises one pig or more according to rule, and there are baby beef clubs which raise beeves. There are poultry clubs to which the girls belong, and tomato clubs and canning clubs where the girls raise their own tomatoes and put them up in cans for the market. One tomato club girl has raised seven thousand pounds of tomatoes on one tenth of an acre, and a chicken club girl cleared one hundred and sixty-five dollars from thirty hens in one year.

These two pigs are of the same litter. The one at the left was raised by this boy, who is a member of a pig club. The other pig, which was raised by his father, is not half so large.

1. Bring some Indian corn to class. Describe an ear and let it tell the story of how it was raised.

2. Why is the corn crop important to the United States? Where did the plant come from and how is it raised? Name six important corn-growing states. What other countries raise corn? (See Table, page 501.)

3. For what is corn used? In what form is much of our crop exported?

4. What are the corn clubs? Tell all you can about them and how to know good corn. What is the average crop per acre? How much did some of the boys raise?

◆

XXXI. IN OUR GREAT WHEAT LANDS

TRAVELING northward up the Mississippi valley, we come at last to St. Paul, and thence go by street car to Minneapolis, the largest flour-milling center of the United States and of the world.

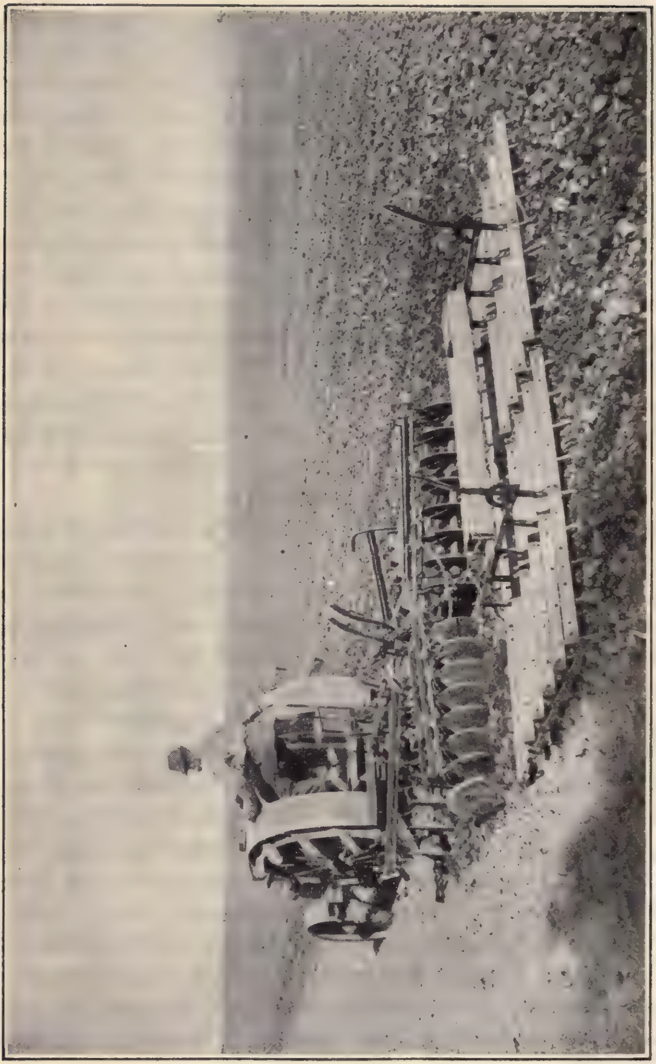
During the latter part of our journey we saw less and less corn and are now in a region where one of the chief crops is wheat. West and north of the Mississippi in both Canada and the United States are some of the best wheat lands upon earth. Wheat is grown in many states, but nowhere to so great an extent as in North Dakota, Minnesota, and Kansas. It is raised in large quantities in the Columbia River basin and also in Canada and in the basin of the Plata in South America. In the Old World, about half of all the wheat produced comes from Europe, and a large amount from India. The chief wheat-producing regions of Europe are in the plains of southern Russia, in the Danube valley, and in France, Italy, and Germany.

Wheat is one of the most important of our food grains. It forms the bread of about one third of the world, and most of us eat some of it at every meal. The wheat plant is one of the grass family to which belong also corn, oats, and all of the other cereals. We know that the grain has been used for ages and some people say it originated in the Holy Land. In the time of the Pharaohs, Egypt was famous for its wheat, and on the walls of some of the ancient tombs are pictures showing how the crop was raised there. The grain was not known in our hemisphere until Columbus came. Nevertheless the New World has some of the best wheat soil upon earth and the United States now grows more than any other country of the world.

In Minnesota and in North and South Dakota to the west of us is the Red River valley, where many wheat farms are managed on a grand scale. Each large farm has its bookkeeper and overseers. It employs hundreds of men, and buys its supplies by the carload.

The soil of the Red River valley is a rich, black earth free from stones and almost as level as a floor. It was once the bed of the ancient Lake Agassiz (ăg′a-sē), which existed here when the great ice sheet overspread the northern part of our continent, and dammed up the valley so that the water could not flow to Hudson Bay. This lake was larger than all of the Great Lakes put together.

But suppose we visit one of these Dakota wheat farms. It is so large that we are several hours riding back and forth over it in our motor cars. Some of the fields contain as much as five hundred acres. The men labor in companies under mounted overseers who gallop from one place to another to see that the work is properly done. Sometimes a score of plows moved by tractors directed by the men who sit upon them, move across the field together. They may plow several acres at a single trip, for the field is almost a mile long. The ground is harrowed in much



Harrows drawn by tractor on one of our great western wheat farms.

the same way, and the wheat is drilled in by seeders, or grain drills. These are long boxes mounted on wheels. From the bottom of each box tubes about as big around as a broomstick run down through hollow steel teeth. The wheat grains fall through the tubes into the furrows made by the teeth, and the earth falling back behind the teeth covers them. In this way a large tract of wheat can be planted in a short time.

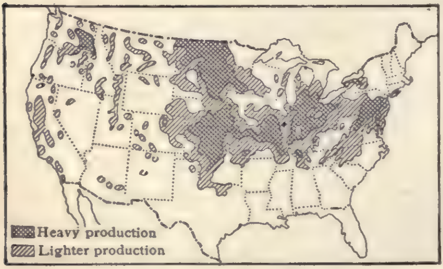
Let us suppose that we are on the farm when the harvest is ripe. Long lines of reaping machines, some pulled by tractors and some by horses and mules, are moving across through the ocean of light yellow grain. The din of the machinery makes us think of a boiler factory and as we come near we find that most of the noise comes from the knives which are moving back and forth a few inches above the ground, cutting the wheat so that the stalks fall back upon the machine. They fall with their heads all the same way and are rolled into a bundle or sheaf, which is bound with string and thrown off. Behind the machines come men who pick up the sheaves and shock them. They are left in the shocks until the grain is dry enough to be threshed.

I have seen threshing in many parts of the world. In some of the wheat lands of Europe, Asia, and South America the grains are pounded out with a club or flail. In other places oxen or horses are driven over the wheat as it lies on the hard ground of the threshing floor, and the feet of the animals tread out the grain. In most parts of our country and Canada, this work is done by threshing machines run by steam or gasoline engines. One large thresher thus does the work of hundreds of oxen or thousands of flails. It separates the grain from the chaff and straw, and the clean wheat flows out through a pipe at the side so fast that it keeps two men busy tying and removing the bags into which it pours. But on most large wheat farms east of the Rocky Mountains it is poured directly into wagons without being bagged, and then it is hauled away to the nearest railway station or wheat elevator.

On the dry lands of the far Northwest, beyond the Rocky Mountains, most of the wheat cures on the stalk without cutting and shocking. There the work of threshing can be done by a combined harvester and thresher called a header. A single machine of this kind will cut off the heads of wheat and thresh them at the rate of two or three thousand bushels of grain in one day.

As we talk with the farmers, we learn that wheat is of many varieties. Winter wheat is sown in the fall and harvested in the early summer. Other kinds of wheat are sown in the spring and harvested later than the winter variety. Spring wheat is sown where the winters are dry and cold with little or no snow. The hard durum wheat, which is used for macaroni, is produced where the land is high and the air comparatively dry. The wheat from moist regions is soft and starchy, while that of less humid regions is usually hard.

We have twenty-one states which raise winter wheat, and twenty which produce spring wheat, some of the states raising both. Among the chief winter-wheat states are Kansas, Illinois, Missouri, Ohio, Oklahoma, Indiana, Pennsylvania, and Michigan. Among the best of the spring-wheat states are Minnesota,



Wheat-growing regions.

North and South Dakota, Nebraska, Washington, and Wisconsin. Much of the wheat raised on our Pacific coast goes to Asia, and a great deal of that raised east of the Rocky Mountains is exported to Europe.

* * *

XXXII. FROM THE WHEAT FARM TO THE FLOUR BARREL

TO-DAY we shall learn how wheat is cared for after leaving the fields, and how it is turned into flour. This is quite as great a business as raising the wheat. At the railway stations of the wheat regions and at all of our grain ports, there are huge elevators for storing the grain before it is shipped to the markets or ground into flour. There are many such granaries at Minneapolis, St. Louis, New York, and New Orleans, and especially at Chicago and other large cities upon the Great Lakes. Minneapolis and Duluth have elevators each of which will store several million bushels of grain, and hundreds of train-loads of wheat come there in a single year.

The elevators are usually built near the railroad tracks, and, at the sea and river ports, close to the water. The wheat is taken from wagons or cars directly into the elevators, and when it is to be shipped it flows out from them into cars or barges or ships. Each elevator contains many huge bins, one of which may be as high as a six-story building and will hold thousands of bushels of wheat. The grain is moved to the top of the elevator in small buckets of tin or zinc fastened to a belt which carries it up and empties it into a large box where it is weighed automatically and then poured into the bins. The wheat is transported from the bins to other parts of the elevator or to the mills near by on moving belts so that it flows like a river into the place where it is needed. It may go on the belt even to the cars or ships. Sometimes the grain is pumped through pipes instead of being carried on belts.

There are elevators at Duluth and other ports of Lake Superior which handle the grain for the steamers that carry it down the Great Lakes to Buffalo. From Buffalo it goes by rail, or in barges on the Barge Canal, to New York to be shipped to Europe. The wheat of western Canada comes to Port Arthur and Fort William on Lake Superior and goes down the lakes and out through the Welland Canal and the St. Lawrence to Europe.

Most of our wheat is used in the United States. It is carried on boats and barges and in cars to our various cities, and during a part of the year long trains of wheat cars move over many of our trunk lines of railroad.

We have left the wheat fields and are back in Minneapolis ready to see the wheat turned into flour. We go to the milling district on the bank of the river. It is covered by enormous buildings of limestone, some of which rise more than two hundred feet above the ground. These are the mills. There are huge elevators near by which rise high above all the buildings. The elevators are now full of wheat, and steady streams of grain are flowing from them into the mills at the rate of more than one hundred thousand bushels per hour. We visit one of the mills. It is of immense size, grinding out so much flour every day that the whole would be enough to make a loaf of bread for every person in the cities of New York, Chicago, Philadelphia, Boston, and Cleveland. It grinds one hundred and seventy-five thousand bushels of wheat every twenty-four hours.

Minneapolis flour mills, and wheat elevator.

We go first to the top of the mill. Here the grain is cleaned by machinery, each kernel being scoured and cleaned again and again. On the floors below the kernels are then passed between steel rollers by which they are crushed. They are broken again and again, more flour being removed at each breaking. From time to time the flour is sifted through wire netting, which grows finer and finer, until finally the net is so fine that every piece the size of a postage stamp has more than one hundred holes. During this process, the bran and other coarse parts of the kernel are taken out, and only the wheat flour is left. This flour is put into barrels by machinery, and the barrels are rolled into the cars to start on their long trip to our homes. The coarser and darker parts of the kernel have great food value, and are left in some brands of flour.

Leaving the milling district, we take a drive through Minneapolis and then go by automobile to St. Paul. The centers of the two cities are only about twelve miles apart and they have grown so rapidly that they will soon come together. They are already practically one commercial and manufacturing center, known as the "Twin Cities of the Northwest." Minneapolis is the larger but St. Paul is the capital of Minnesota. St. Paul is an important railway and commercial center. It has large packing houses and wholesale establishments. Minneapolis has many factories besides its flour mills. It operates woolen mills, and saws great quantities of timber into lumber of various kinds.

The growth of these two cities is due largely to their situation in a rich country of forests and farms at the head of navigation on the Mississippi and near the Great Lakes. Goods may be sent from them by water down the Mississippi, or after a short haul of one hundred and fifty miles on the railroad, down the Great Lakes to the vast population to be reached from their shores, and also through the New York Barge Canal or the St. Lawrence to the ocean ports for shipment to Europe. The milling industry and growth of Minneapolis are largely due to the water power of the Falls of St. Anthony.

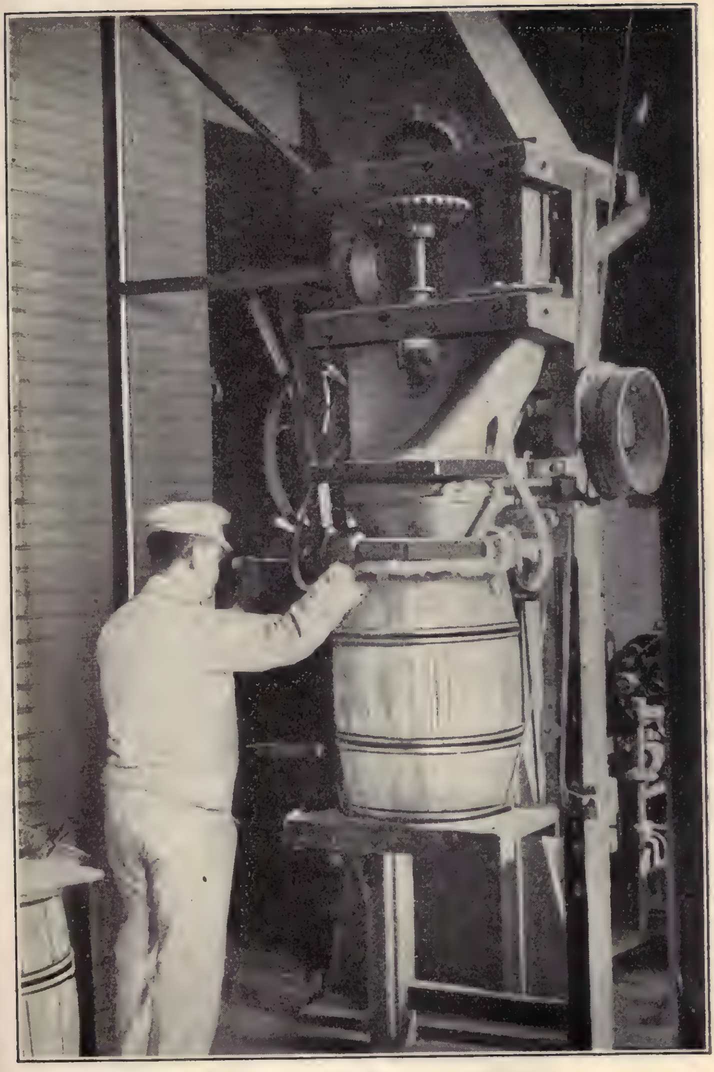
1. To what family does wheat belong? From what land was it brought to the United States? Name some of the countries where it is grown.

2. Locate the Red River valley. Describe your visit to a wheat farm in that region. Why can tractors be used there? What advantages has a tractor over horses?

3. What is spring wheat? Winter wheat? What are the chief spring-wheat states? The chief winter-wheat states? Which states send most of their exports to Asia?

4. Trace a bushel of wheat from the grain drill to the elevator. Trace a barrel of flour from Minneapolis to your own home. How does it travel and how far does it go?

5. Follow a barrel of flour from Minneapolis to Hamburg, via Duluth, Buffalo, and New York, going all the way by water. Trace a bushel of wheat from San Francisco to Liverpool. Through what canal does it go? How far does it travel? (See page 496.) Trace a bushel from Seattle to Shanghai.



Filling barrels with flour by machinery.

6. When is wheat planted and harvested in Ohio? In North Dakota?

7. Compare wheat with corn. Can you guess why wheat is sometimes called the lazy man's crop?

8. Locate Minneapolis and St. Paul. Show why large cities have grown up at that point.

* * *

XXXIII. THE IRON MINES OF LAKE SUPERIOR

FROM St. Paul we go to Duluth at the head of Lake Superior. The distance is one hundred and fifty-two miles, and the journey by rail is made within five or six hours. It takes us from the head of navigation on the Mississippi to the head of navigation on the Great Lakes, and we are almost ready to start on our voyage down that wonderful waterway.

But we must first see something of the iron mines and lumber regions about Lake Superior and Lake Michigan. We shall visit the iron mines first.

A great part of our riches comes from iron. We are now mining more iron than any other country, and we lead the world in the production of things made from iron and steel. No other land has such extensive beds of iron ore as the United States, and nowhere else have we so much ore as right here about Lake Superior. More than three fourths of the iron we have taken out of the earth has come from this region, and we sometimes mine in one year as much as seventy-five million tons. This is more than enough to make thirty million tons of steel; so much that if turned into steel rails weighing fifty pounds to the yard it would be sufficient to lay a track three hundred thousand miles long. This is more railway track than we have in the whole

United States, and far more than that of all the railways of Europe and Asia.

In addition to our Lake Superior iron, we have iron in many other parts of the Union. It is mined in twenty-six different states, and there are vast beds of it in Tennessee, Alabama, Virginia, and Georgia. For a long time Pennsylvania was our chief source of supply. New York, New Jersey, and Ohio all produce iron, and Texas, Wyoming, and Utah have extensive deposits. In fact, North America is supposed to have more iron ore than any other part of the globe, although iron is found in every continent, and is mined in large quantities in many of the countries of Europe.

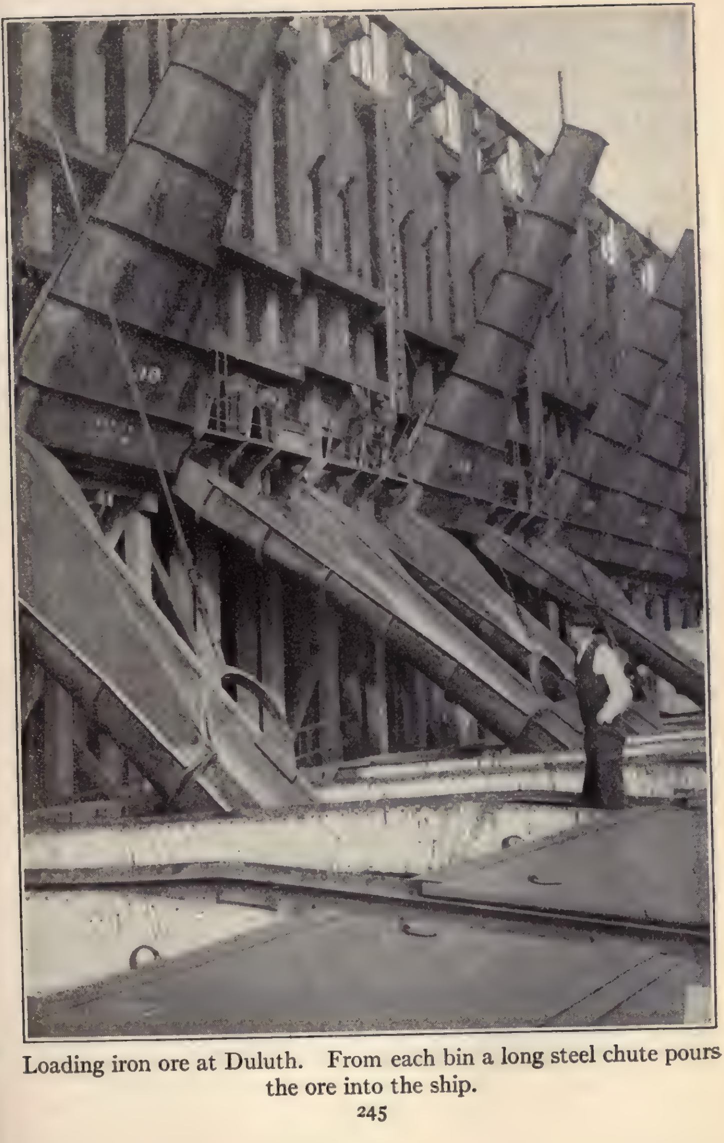
Iron is the most abundant of all metals, and it has been used by man in one way or another for thousands of years. In the British Museum is an Egyptian axhead dating from 1370 B. C. and a piece of iron taken from the great pyramid near Cairo which is believed to be about six thousand years old. A fragment of a saw forty-four inches long, which was in use almost three thousand years ago, was found in some ruins on the banks of the Tigris River, and near Delhi in India I have seen a famous iron pillar which dates from 400 B. C. This pillar is twenty-two feet high and weighs about six tons. It was made by welding disks of iron together. The Greeks used iron, and the Romans made both wrought iron and steel. To-day there is hardly a man, woman, or child in the world who does not use iron every day in some form or other, and we are dependent upon iron and steel for the making of nearly all the things that we eat, drink, or wear.

As iron ore lies in the earth it is in beds, or in veins or pockets walled about with rock, and the metal is not pure but combined with other elements, as it is in iron rust.

It is only by smelting the ore with limestone, that we can get the iron out, nearly pure.

Now smelting requires coal, but there are no good coal fields within hundreds of miles of Lake Superior. Therefore the iron ore must be brought to the coal, or the coal must be brought to the iron. It is found that the iron can be taken more cheaply to the coal than the coal to the iron. Therefore, most of the ore is carried down through the Great Lakes to Chicago, Gary, Toledo, Cleveland, Buffalo, and to other ports from which it is sent by rail to the cities of the Pittsburgh district. At these ports and cities the coal and iron are easily brought together, and hence we shall find there large manufacturing industries of iron and steel.

But let us visit some of the mining districts of the Lake Superior region. We shall go first to Hibbing in the Mesa'bi Range not far west of Lake Superior. We are one thousand feet above the surface of the lake, and sixteen hundred feet above the level of the ocean. We are on the height of land just about halfway between the Gulf of Mexico and the Arctic Ocean. All about us are great mines in which steam shovels are digging the ore out of the earth, and loading it upon the cars. Long train loads of ore shoot by us on their way down to the lake. There they will run out upon a high track and drop their loads into huge bins where by opening a steel trough in the bottom the ore can be run down into the steamers. The machinery of mining, loading, and transportation is such that the ore does not need to be touched by the hand of man between the bed in which it lies and the furnaces, almost one thousand miles away. Huge unloaders will pick the iron out of the steamers and drop it into the cars at the rate of fifteen tons every two minutes.



Loading iron ore at Duluth. From each bin a long steel chute pours the ore into the ship.

The cars will be unloaded by machinery, and steam or electricity will carry the ore to the top of the furnaces, from which the metal will flow out to be made into pig iron and then into steel.

Before going to the mines we ask how men can tell where the ore beds lie in the earth. We are shown the diamond drills, great machines which cut out holes or wells in the rock as big around as a tumbler, and bring up cores of the strata through which they go. Some of the holes thus made are a thousand feet deep, and the core shows the character of the rock all the way down. If there is iron one can see just where it lies. By making many such holes they could mark out the exact extent and form of each ore deposit. This was the first thing to be done. After that, the men tell us, they had to clear the land, for the whole country was covered with forests, and then take away the earth and rock above the ore bed. This was done with steam shovels, the mass being carried away on cars. After that the ore was ready to be dug out and loaded upon the trains which transport it to the ships on Lake Superior.

We can easily see the methods of mining by going to one of the great pits from which ore is now being taken. We select a mine so near Hibbing that we can easily walk to it. This mine is an oval pit of more than three hundred acres, out of which more than sixty million tons of ore have been mined, and which is still producing several million tons every year.

As we stand on the grass at the edge of the mine we are, as it were, on the top seats of an amphitheater, the arena or bottom of which is as large as a good-sized farm. The sides of the amphitheater slope to the bottom and we can see the strata of earth, clay, and rock which the steam

Iron mine. The big shovel is worked by steam power.

shovels had to carry away before the ore bed was reached. There are railroads running around the walls of the mine, and the tracks are so arranged that the ore is easily hauled to the surface. In the pit itself men are now digging and preparing for blasting, and steam shovels are lifting the iron up and dropping it into the cars. One shovel will take up two tons at a bite and will fill a fifty-ton car in less than five minutes.

In another part of this region we visit mines where the ore is so far down that it is cheaper to mine it by underground workings. We go on elevators down the shafts which lead to the mines, and walk about through the huge chambers out of which the ore has been cut and shipped to the surface. The roofs are upheld by huge timbers, and some chambers have floors of thick logs. After the ore has been all taken out the roof is allowed to drop and the floor is made to serve as the roof for another chamber which is cut out below. The underground mines are lighted by electricity, and the cars and other machinery are moved by the same power.

Coming back to Hibbing, we take an automobile and ride from one mining town to another. We are surprised to find excellent roads, here away off in the wilds. The schoolhouses are better than those of many of the cities of other parts of Minnesota and some of them have athletic grounds and swimming tanks. Even the villages are lighted with electric lights, and some have public libraries and parks. The money for such things comes largely from the royalties paid by the companies, which operate the mines at so much per ton on the ore taken out. Many of the counties and towns own the land where the ore lies and rent it out at such prices that the rent pays most of the taxes.

Leaving the Mesabi Range, we visit other iron regions in Minnesota; and then going to the south shores of Lake Superior, we travel through the hills of Wisconsin and Michigan, where are other iron ore reserves of wonderful extent.

In the same district we visit the copper mines of Calumet and Hecla on the Ke′weenaw Peninsula, which juts out into the lake. Here, beginning at the surface and extending far down, is a mass of rock which is streaked and veined with almost pure copper. There are copper mines in northern Michigan which are a half mile or even a mile deep. The ore is taken to the mills not far away and is there crushed into powder and washed. After this the copper is smelted in great furnaces, from which it flows out and is molded into copper bars. The bars are shipped down the lakes to the factories where they are manufactured into wire or the many other things for which copper is used. The copper is mixed with zinc in the making of brass and it is largely employed in electrical machinery of various kinds.

A story is told of how the copper deposits of Lake Superior were discovered by a pig which had fallen into a hole and was trying to root its way out. In doing so it uncovered some nuggets of this wonderful metal. Since then more than five billion pounds of copper have been taken out of the Lake Superior region, and it is said that there is more than half as much left. We shall learn more about this important metal when we travel through our western highlands, from which most of our copper now comes.

1. Make a list of twenty things that are made of iron or by means of it, selecting ten from the room in which you now are. What factories in or near your town are connected with the iron industry?

2. How long has iron been used by man? Tell something of its history.

3. How do men find where the ore lies in the earth? Compare the iron production of the United States with that of other countries. (See page 499.) Compare that of the Lake Superior region with the rest of the United States.

4. Suppose all the steel tracks of our railways were taken away. How soon could the Lake Superior mines supply enough iron ore to make the steel to replace them?

5. Describe your visit to the mines of the Mesabi range. What is open-pit mining? What is underground mining?

6. Trace a ton of ore from the mines to the smelters. How far does it travel from Duluth to Detroit? To Cleveland? To Chicago? (See pages 218–219.)

7. Why is not the Lake Superior ore smelted at the mines?

8. Where is copper found in the Lake Superior region? Where are our chief copper deposits?

XXXIV. A TRAMP THROUGH THE WOODS — OUR LUMBER INDUSTRY

PUT on your rough clothing and hobnail shoes and get ready for a tramp through the woods. We are now in one of the largest lumber regions of the United States. We can go out to the camps where the lumbermen are felling trees and visit the sawmills where they are sawing the logs into lumber. Not many years ago we might have traveled east and south from here for hundreds of miles and seen nothing but pines and other tall trees. This is a part of the great forest tract that covered the northern and eastern part of our continent when the New World was discovered. At that time almost one third of what is now the United States was thickly wooded, The timber that then stood upon it has been estimated by our Forestry Service at more than five thousand billion square feet, or enough to make a boardwalk a foot wide, an inch thick, and so long that it would reach ten times as far as from here to the sun. The total area of those woodlands was equal to almost one third of all Europe.

This vast tract was made up of five immense forests. In the eastern part of our country, beginning at the ocean and running westward, were the northern woods, the central woods, and the southern woods. The northern woods, which covered an area six times as great as that of Ohio, were the home of the white pine. The southern woods, in which we have already traveled, were chiefly cypress and yellow pine; they were about equal in area to the woods of the north. The central forests covered more territory than those of either the North or the South, and their timber was largely oaks, beeches, maples, and other hardwoods.

In addition to these woodlands of the east were the forests found in the Rocky Mountains and on the Pacific Coast. Their areas were not so large, but the trees of the Pacific region were of such enormous size that the lumber in them almost equaled that of the hardwood central forest of our eastern states. They had the redwoods and "big trees," the giants of California, the largest trees known to man, and also the western yellow pine and the Douglas fir. It is from the latter trees that a large part of our lumber to-day comes.

Long after the lands east of the Mississippi were settled we had so many trees that no one thought of saving them. The pioneers cut them down as fact as they could, piled them up where they fell, and burned them to get the land clear for farms. Sometimes they burned the logs for the potash in the ashes. Vast tracts were wasted also by forest fires, and the lumbering was done in such a way that much of the best wood was lost. This destruction of our forests continued for years, and more than half of all our timber has now disappeared.

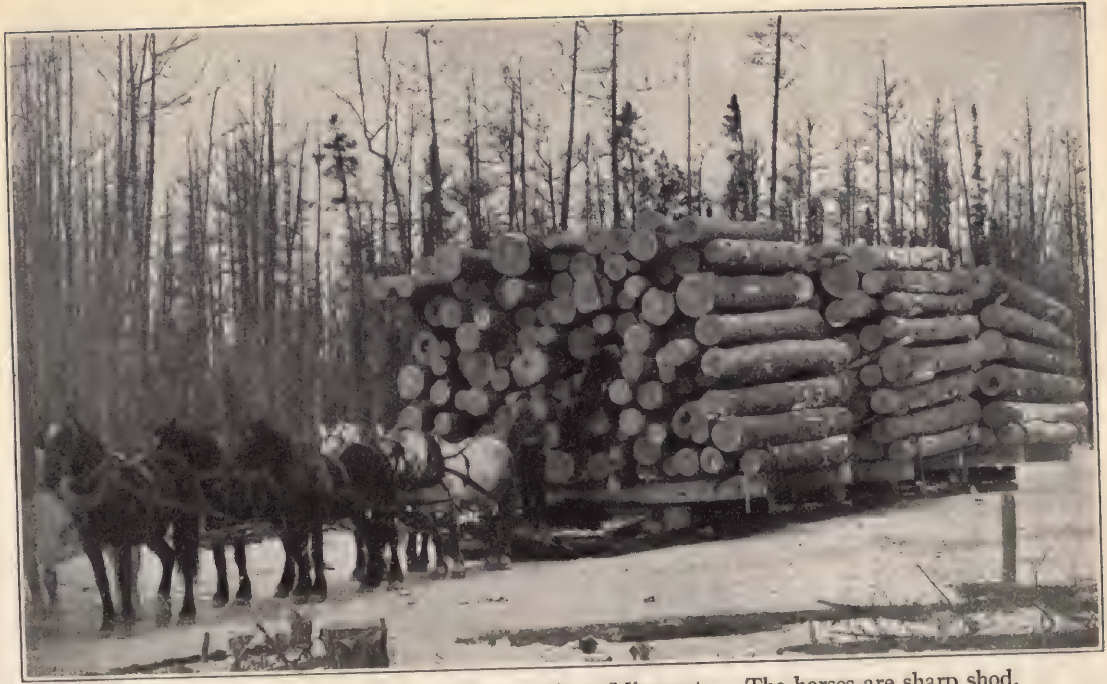
The work of felling the trees is still going on wastefully. In the woodlands of the South lumbermen are moving from one forest to another in little houses so made that they can be carried upon the railroad and lifted on and off the cars at will. Along the Great Lakes, a great part of the forests has been cut away, and along the Pacific Coast woods lumbermen are felling eight or ten billion feet of timber per annum. In 1918 we had about fifteen thousand sawmills, some of which worked day and night. The annual cut at that time was almost thirty-two billion feet of lumber, board measure. If it should keep on the same way within a comparatively few years we should have no lumber left.

We wonder what we shall do for wood in the future. The thought makes us tremble; for how in the world could we get on without wood? It is wood that forms most of our houses, and almost all of our furniture. It bridges our streams, timbers our mines, and holds in place the steel rails over which we fly on the cars. We soar through the skies in airplanes with wooden propellers and we move over the ocean in steamers in which much wood is used. In one year we employ more than one billion feet of timber for telegraph poles and fence posts and rails. We use one hundred and sixty-five million cubic feet a year for timbering mines, and an enormous amount for barrels. We grind up millions of cords of soft wood every year to make paper, and hundreds of acres of forests are annually burned up as matches. There is a factory in Maine that turns out a half billion toothpicks every twelve months, and there are other establishments that make spools and clothespins by the hundreds of millions. Indeed there are so many uses of wood we cannot mention them all.

To replace the woods which have already been cut, to give us lumber for the future, and to preserve the forests as a cover for our water supply, our government is now advising the people everywhere to plant trees. It has also set aside several hundred million acres in various parts of our country as national forests, where the trees will be cared for, and only those which have reached their full growth will be cut. In addition thirty-three of our states are reserving large tracts of public forest, and in many places trees are being planted. The national and state forests comprise about one fourth of the woodland we now have.

Lumbering in the Great Lakes region is done best when there is snow on the ground. Then the logs can be hauled on sledges down to the streams and piled up on the banks or on the ice. They are often rolled out upon the ice so that for a long distance a stream may be covered with them. The ice is sometimes several feet thick, and it does not break under the great weight. When the spring thaws come the streams rise, and the freshets carry the logs down to the lakes or to rivers upon which they can be floated to the mills.

Lumbering usually begins in the fall. At that time the men go into the woods, and build log cabins for their winter homes, filling the cracks between the logs with mud and sod. They have fires to keep themselves warm. Often fifty men will live in one cabin, sleeping in bunks which



Hauling pine logs to a lumber mill in northern Minnesota. The horses are sharp shod.

run in tiers around the walls. They eat at a common table, using tin plates and other dishes which will not easily break. They take with them enough provisions to last all winter, and their pork and canned meats and hot breads are often varied by wild turkey roasts, venison stews, or bear steaks from game shot upon the ground.

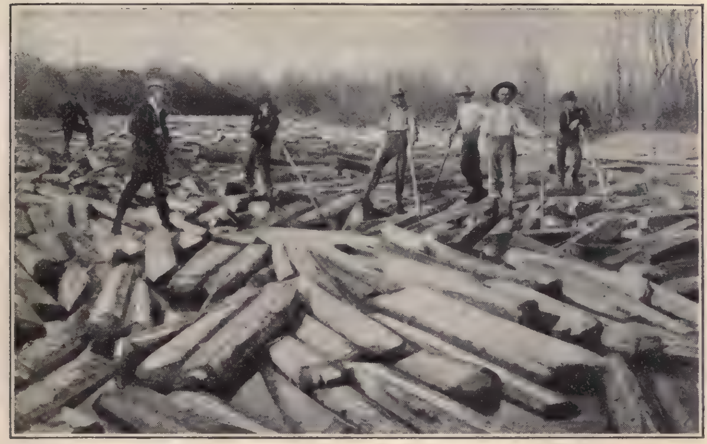
In felling the forest everything is done according to system. The underchopper first goes through the forest and marks those trees which will make the best lumber, and after him come the axemen and sawyers. The sawyers make a cut about the trunk near the earth with a long saw, which they pull back and forth. Then the men chop above and beyond the cut until the giant of the forest drops with a crash to the ground. After this the limbs must be trimmed off and the trunk sawed into logs.

In getting the logs to the stream the snow roads are sprinkled with water which Jack Frost turns to ice. Such roads are so slippery that the horses, sharp shod by the camp blacksmith, can haul over them many times as much as they could on a common road with a wagon. A load of logs big enough to fill an ordinary bedroom from the floor to the ceiling is thus carried down to the water.

In the forests of the South, the logs are slung to high wheeled trucks (picture, page 256); or they may be hauled to a railroad by means of a steam engine to which is fastened a rope as thick as a broom handle and a mile or more long. This is wrapped about the log as it lies in the forest. Then the engine is started and it winds up the rope thus dragging the log to the cars. In the Pacific Coast forests, which we shall visit later on in our travels, a single log often makes a carload.

Hauling a big log to mill in the South.

It is interesting to follow the logs down the streams to the sawmills. A gang of men goes along with each drive to keep the logs moving and prevent them from catching on the banks and causing a jam. The men walk on the logs from one to another, holding them apart and keeping them straight. The men have sharp nails in the soles of their boots to give them a sure footing, and they use long poles ending in hooks and spikes to push and pull the logs this way and that. When a jam occurs, the logs act as if they were crazy. They climb one on top of another; some dive under the jam and some stand on end against it. After a while they become so wedged into one mass that it is hard to see how they can be taken apart. However, the logger goes with his pikes to the front of the jam and inch by inch pulls out the logs forming its keystone, and then the whole jam comes tumbling down the river.



A log jam. The lumbermen pry the logs apart with long poles.

When the logs get to the sawmills they are handled by machinery. They seem to crawl like live things out of the water and up the gangways, and on to the saws. Some of the mills have gang saws, each of which consists of a number of saws that move up and down through the log, cutting the whole into boards at once. Others use the band saw, a wide belt of steel with teeth on one edge. This moves like a band of leather upon two great wheels, one of which is high over the other. As the steel belt flies round, the teeth on its front edge saw through the log, making boards even faster than the gang saws.

1. When America was discovered what part of our country was covered with woods? Where was the home of the white pine? Of the yellow pine and the cypress? Of most of the hardwoods? What kind of trees grow in the far west?

2. About how much lumber do we cut in one year? Estimating the present stand of timber at twenty-five hundred billion feet, how long will our lumber last at this rate?

3. Look about the school room and point out the places where wood is used. Mention other uses. Imagine how men could get along in a world without wood. What might take its place?

4. Of what is this book made? Of what are newspapers made?

5. Why is lumbering about the Great Lakes carried on in the winter?

6. Visit a lumber camp and describe the work you see there. Visit a lumber mill and describe it.

XXXV. THE GREAT LAKES — OUR MOST IMPORTANT WATERWAY

WE have returned to Duluth and are now ready to start on our voyage down the Great Lakes. We are at the chief United States terminal of the most wonderful inland water route upon earth. The Great Lakes, including the St. Lawrence River, form a navigable waterway more than two thirds as long as from New York to Liverpool. The shore line of the lakes gives access to eight of our greatest states, whose population is more than one third of that of the Union and whose agricultural and mineral products are of enormous importance. The lakes connect us also with an almost equal area in Canada, with its immense resources in grain, timber, and minerals of many kinds.

The upper lakes are frozen during the winter, and for the five months from November to April are almost as deserted as the icy seas about the North Pole. It is only in the seven warmer months that ships can navigate them, but in that time more freight is carried upon them than is brought into any port of the world in one year. Throughout the summer, day and night, there moves over this waterway an almost endless fleet of steel steamships, barges, whalebacks, and magnificent passenger vessels, carrying millions of tons of freight and thousands of people to and fro. Within one season the ore fleet carries down the lakes more than sixty million tons of ore from the iron mines about Lake Superior, and the wheat fleet transports more than a quarter of a billion bushels. Many of these vessels bring back coal to supply the northwestern part of our country, carrying in one season enough to fill a train of fifty-ton cars reaching from Boston to San Francisco.

All this is done at low cost. Before the World War the freight rates in the lakes were lower than now. At that time a bushel of wheat was taken from Duluth to Buffalo, a distance of one thousand miles, for one cent and a half, and two tons of iron ore from the mines of Lake Superior to the ports of Lake Erie for little more than one dollar. The rates are higher now, but they are far lower than those of the railway.

But before we go farther let us examine the basin in which these vast fresh-water seas lie. It is situated on the crown of the eastern part of our continent, so that on the north just over the rim the ground slopes toward Hudson Bay, and on the south toward the Gulf of Mexico. The rim of parts of the basin on the south is so low that canals have been cut from Lake Erie to the Ohio River, and from the southern end of Lake Michigan to the Mississippi

River, and goods might be carried from the lakes to the Gulf of Mexico in that way. From Lake Erie at Buffalo, the New York Barge Canal transports freight to the Hudson River, upon which it goes to the port of New York. The northern rim of the basin also is low, and a traveler can paddle his way up the streams flowing from the north into Lake Superior, and, by carrying his canoe a short distance, can drop it into other streams and float down to Hudson Bay.

An important feature of the Great Lakes basin is that it tilts gently toward the east from where we are now clear out to the ocean. The descent is all together only six hundred feet in about two thousand miles, and most of this is made in three steps. At the top is Lake Superior, the surface of which is about fifty feet higher above the sea then the top of the Washington Monument. The first step or drop is about twenty feet, and is made where Lake Superior pours into Lake Huron. Below this point we find Lakes Huron, Michigan, and Erie on nearly the same level. The second great step or drop is at the rapids and falls of Niagara River, where the waters pour down to the level of Lake Ontario. From there they flow on through the valley of the St. Lawrence out to the sea, with a third step or drop at the rapids in that river.

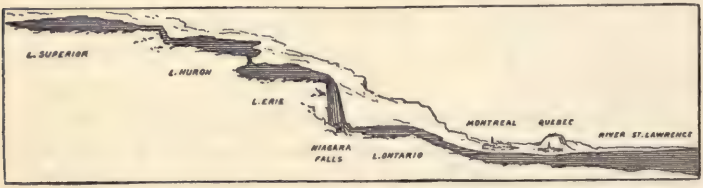


Diagram showing the Lake Terraces

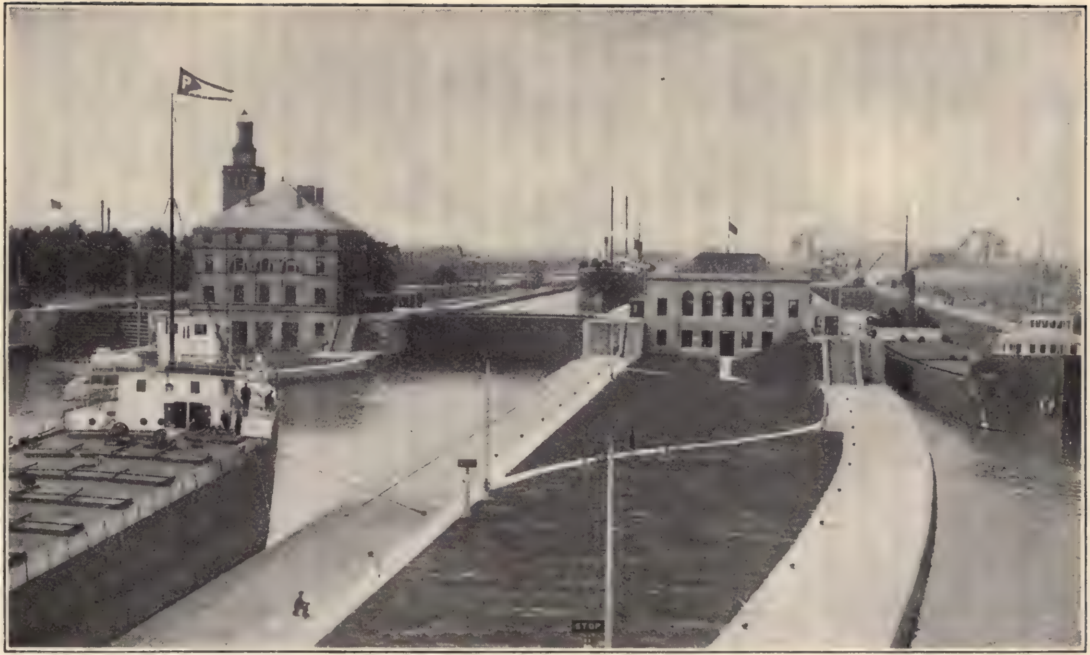
But how do the steamers with their loads of freight climb up and down these steps?

They cannot go from Ontario up the swift Niagara River and mount the falls; nor can they make their way up through the rocky rapids of the St. Marys River, over which the waters of Lake Superior foam as they rush on toward Lake Huron. No; that is impossible. The ships must be lifted or let down from one level to another by means of lock canals. Such canals have been built between Lake Ontario and Lake Erie, and around St. Marys Falls between Lake Huron and Lake Superior. There are other canals with locks around the rapids of the St. Lawrence. The surface of the Great Lakes is level and the steamers move back and forth as though on the ocean.

We are now ready to begin our trip down the lakes. The most wonderful feature of our voyage will be passing through the locks at St. Marys. Our steamer is a hollow shell of steel almost six hundred feet long and sixty feet wide. Its hold is twenty feet deep and is divided into hatches which contain twelve thousand tons of iron ore. The engines are at the stern and they move the ship onward by a screw propeller, which whirls around at the rate of ninety revolutions a minute.

The vessel makes the round trip from the head of Lake Superior to the ports of Lake Erie and return, a distance of almost two thousand miles, in about one week; and it goes onward so steadily that we hardly know we are steaming. We leave Duluth in the morning and are soon out of sight of land. We are on Lake Superior, the largest freshwater lake of the world, its only rival in size being Lake Victoria in Central Africa.

It is four hundred and twenty miles from Duluth to the "Soo," where we are to make our twenty-foot jump



Ships in the "Soo" canal. The gates between the locks are opened and shut by electric power.

down to Lake Huron. We enter the St. Marys Canal and come to the locks. There are two on the American side and one on the Canadian side. The greatest of all is the Davis Lock, belonging to us. It is thirteen hundred and fifty feet long, eighty feet broad, and more than twenty-four feet in depth. It will hold two huge steamers like ours. As we approach it, the great steel water-tight gates facing us open, and when we have entered they again come together. The time of opening and closing is less than four minutes. We are now in a huge vat of water, with the deck of our steamer far above the walls on each side. We can look over the gates at the front and see the waters of the St. Marys River below us.

But lo! We are sinking. The holes in the bottom of the lock have been opened and the steamer drops down, down, as the water flows out, until at last it is on the level of the river below. Now the gates in front of us move; they are soon wide open and we steam on into the St. Marys, which leads to Lake Huron. The lock is operated by electricity and it has lowered our huge steamer down this step in less than a quarter of a hour.

Here at the St. Marys Canal is a good place to learn the character of the traffic that passes up and down this great waterway. A record is kept of the freight, and we find that its volume is greater than that of any other canal of the world. It is many times that of the Panama Canal or the Suez Canal, and still it does not include the cargoes that go out of Lake Huron through the Strait of Mackinac (măk′ĭ-nô) into Lake Michigan, which form a large part of the traffic of the Great Lakes. In 1916 there passed through these locks at the "Soo" fifteen million tons of coal, five hundred and twenty million pounds of copper, and sixty-three million tons of iron ore. There were raised or lowered more than two hundred thousand tons of manufactured iron, seven hundred thousand barrels of salt, ten million barrels of flour, and two hundred and twenty-seven million bushels of wheat. In the same time the ships going through the canal carried also more than fifty-five thousand passengers and more than a million and a half tons of merchandise.

Leaving the "Soo," we traverse Lake Huron and enter the St. Clair River, which, with Lake St. Clair and the Detroit River, forms the down spout from Lake Huron to Lake Erie. There is a fall of only eight feet in the whole length of these rivers, and the current is so slight that we do not notice it. We stop a day or so in the river at Detroit and then move on through the Detroit River and across Lake Erie to Cleveland, where we discharge our cargo of ore to the steel mills at that point. A night's ride on another steamer takes us to Buffalo, whence the New York Barge Canal leads down to the Hudson River, giving a waterway the whole distance from Duluth to the city of New York.

1. Locate the Great Lakes and describe them. Which is the largest? The smallest?

2. Make a sketch map of the Great Lakes, showing the routes of the ships.

3. Name the states which border the lakes. What great country lies at the north? What part of the lakes does it own? Which lake belongs wholly to the United States?

4. What is the open season on the Great Lakes? Describe your trip through the locks of the St. Marys Canal. Why are locks needed? Tell how they are operated. What is the drop from Lake Superior to the Atlantic? To Lake Huron? From Lake Erie to Lake Ontario?

5. Name some items of traffic on the Great Lakes. Which weighs the most? Describe our steamer, and trace the route from Duluth to Buffalo.

Detroit water front on Detroit River; boats from many Lake ports.

XXXVI. OUR CITIES ON THE LAKES

SOME of the largest cities of the United States are situated on the Great Lakes. Chicago is surpassed in size only by New York, and Detroit ranks next to Philadelphia, being our fourth largest city. Cleveland comes next, and still farther eastward, at the foot of Lake Erie, is Buffalo, an important grain, steel, and coal center at the place where the traffic of the New York Barge Canal and that of the Great Lakes come together. Other important manufacturing lake cities are Toledo (tô-lē′dō), within an hour's ride of Detroit; Milwaukee, within a short distance by steam of Chicago; and Duluth, at the head of Lake Superior. All of these cities have grown because of the cheap transportation on the lakes, and because of certain special advantages which each has from the country surrounding it.

On our way down the lakes we make our first long stop at Detroit. As we enter the river we are one of a great fleet of steamers, which during the open lake season moves steadily through here day and night. There are ships carrying copper and iron ore and lumber going south and others loaded with coal and merchandise on their way north. The ships are so many that one passes the city of Detroit every three minutes during the season, and their freight in one season of seven months is so great that it more than equals that of the Suez Canal in one year.

Detroit has trunk lines of railway reaching every part of the United States, and by a tunnel under the river it has railway connection with Canada. It has the best facilities both by water and by rail for getting cheap coal, wood, iron, and other raw materials, and therefore has become a great manufacturing center.

It is partly on this account that Detroit is the principal seat of our motor car industry. Riding through the city, one sees many great factories making the cars and trucks which are shipped from here to all parts of the world. More than ninety thousand men are employed in making automobiles and things connected with them, and the output of such vehicles in one year has numbered more than one million.

Some of the motor car plants cover an area equal to that of a good-sized farm, and in one of the factories we walk through a room which covers more than sixteen acres. It is so filled with machinery that it looks like a great forest of fast-moving belts and wheels. There are fifty miles of leather belting in the room, and its eight thousand machines require twenty-five thousand gallons of lubricating oil every twenty-four hours. As we stand at one end of it we cannot see the walls at the other, and the belts are so many that they almost hide the ceiling. The noise is deafening. There is the shrill cutting of steel upon steel, the buzzing of grinding wheels like the swarming of locusts, and the pounding of hammers. Here and there are to be seen men in blue overalls directing the machines or feeding the steel into them.

The works of such a factory are so arranged that there is no loss of motion. The raw materials in the shape of rough forgings and castings start in at one end of the building, and, after passing through many machines, come out at the other in cars and trucks ready to start out on their work of transporting men and goods over the country. Detroit has one plant which takes the ore of Lake Superior, turns it into steel, and then passes the steel on through such machines and such skilled handling that when it comes out it is a gasoline farm tractor ready to take the place of horses in plowing or harrowing or harvesting.

Detroit is the best place in our country to learn about automobiles. The United States has so many motor cars that there is now one to every three or four families. The number is over seven millions, and we have so many trucks that they do a great part of our hauling. There is good reason for calling this the motor car age.

Scene in Cadillac Square, Detroit. This is the chief automobile center of the country.

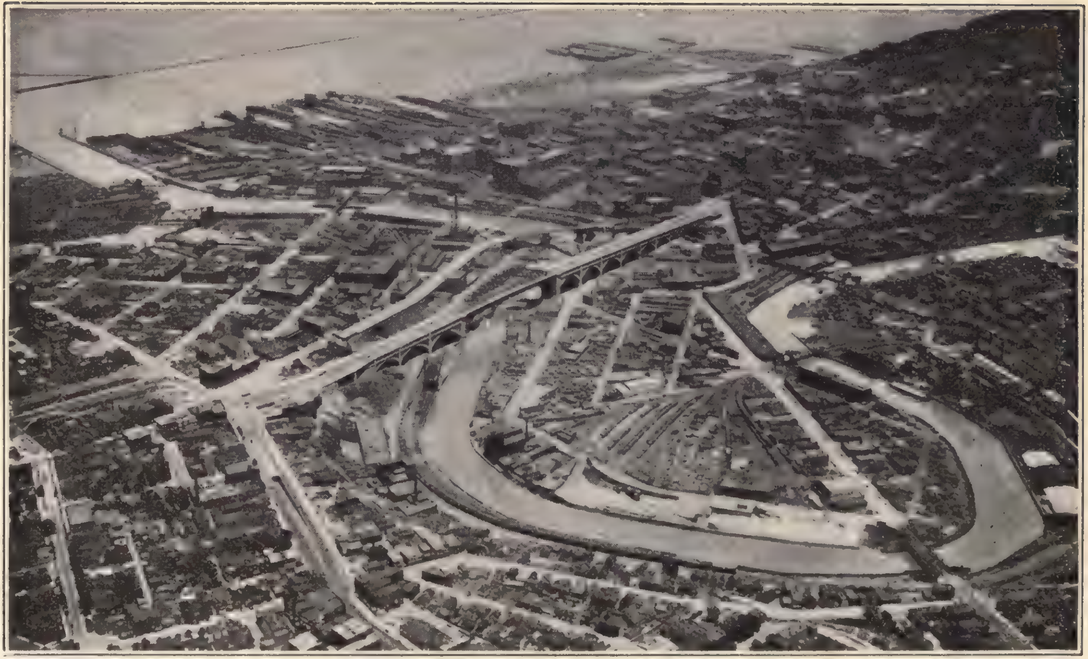
During our stay we take automobiles and explore Detroit, riding for miles through Woodward and Jefferson avenues under the shade of their magnificent maples and elms. The streets are so many that if joined together they would reach from here almost all the way to New

York, or more than halfway to New Orleans, or more than one fifth of the distance to San Francisco.

We take the ferry and cross over the river to Windsor in Canada to see how it feels to have one's feet on foreign soil; and upon our return we take automobiles for Toledo. Toledo is on the Maumee′ River about nine miles from Lake Erie. It has thirty miles of frontage on the river, and more than twenty miles of docks. It handles immense quantities of grain and iron ore which come down the lakes, and is a large manufacturing center, making automobiles, plate glass, and many other things. It has one automobile plant employing fifteen thousand persons, and a glass factory which in one year makes more than one billion bottles.

From Toledo we motor over excellent roads to Cleveland, stopping on the way at Fremont, which was the home of President Hayes. Cleveland is celebrated for its manufactures of oil, iron, and steel. It makes ships for the lake trade, and all kinds of machinery. It is situated on Lake Erie at the mouth of the Cuyahoga (kī-a-hō′ga) River, at a place where the iron ore of Lake Superior and the soft coal of Ohio and Pennsylvania can be cheaply brought together. It also is on some of the chief trunk lines between New York and Chicago, and it can be reached over night by train from almost any part of our country lying between the Atlantic Ocean and the Mississippi River.

We stroll from our hotel down to the wharves and watch the unloading of iron ore. This work is done by great machines. A man by pressing a button causes what we might call a steel giant to reach with his arm down into the hold of the ship and pick up in his fist as much ore as thirty horses could haul on a wagon. The giant's hand, directed by the man above, moves around through the



Airplane view of Cleveland. The Cuyahoga River flows through the city, to Lake Erie.

hold and scrapes together the ore, and then, as the man pulls a lever, raises and drops it into the cars in which it goes to the furnaces. This is only figuratively speaking. The hand is in fact a grab bucket whose jaws are open when it drops down on the ore, and are closed at the will of the man who works the machinery. The machine moves so fast that it costs only a few cents a ton to unload a great steamer, a single giant doing the work of hundreds of men.

Going to other docks not far away, we see how coal is loaded. The cars are lifted by machinery above the deck of the steamer to the height of a five-story house, and the coal is dumped into a chute which carries it into the hold. At another place we watch men loading coal with grab buckets much like those used for unloading the ore. Each bucket has two great jaws which will swallow twelve tons at one bite.

Cleveland is one of our most beautiful cities. It has fifty acres of lakes and ponds in its parks, and we are able to hire bathing suits and go swimming. We stop awhile with the children in their many playgrounds and watch a game of baseball on one of the diamonds. Later we photograph the bronze statue of Captain Oliver H. Perry, in a public square not far from the lake. It represents Captain Perry when he commanded our fleet and captured the British squadron on Lake Erie in our War of 1812. Perry was only twenty-seven years old at that time. The British expected an easy conquest, but Perry was victorious, and in sending the news of his triumph to General William Henry Harrison, he used these famous words:

"We have met the enemy, and they are ours."

After strolling along Euclid Avenue we go to the cemetery near the lake to see the marble monument over the grave of President Garfield, who was born on a farm not far away. As a boy he worked driving mules on a tow-path of the Ohio Canal.

A night's ride on the steamer brings us from Cleveland to Buffalo. The city is situated at the head of the Niagara River and about twenty miles above Niagara Falls.

It is one of the chief gateways between the sea and the vast regions of the upper lakes. Not far from it is the head of the Welland Canal, which, passing through Canada, connects Lake Erie with Lake Ontario. The city is the

The New York Barge Canal at Buffalo. The canal took 15 years to build and cost over $180,000,000.

western terminus of the New York Barge Canal which joins the Great Lakes with New York by way of the Hudson River.

Buffalo is famous also for its excellent railway facilities, and it is on some of the chief automobile and motor car routes from the East to the West. Owing to the cheap water rate at which grain is brought from Duluth, Buffalo has many flour mills, and its cheap freights for iron and coal have aided in building up a great iron and steel manufacturing industry. In addition the cheap electric power generated at Niagara Falls comes over wires to the city, running its street cars and many of its factories.

During our stay in Buffalo we visit the mills, and then go out to a great plant where hundreds of workmen are turning out flying machines of various kinds. We are taken by aviators out to the aviation field and each of us is given an airplane ride through the skies. The pilots put their machines through all sorts of motions. They make them loop the loop, turn somersaults, and take nose dives this way and that. It is worse than riding on a huge roller coaster, and we are glad when we glide down to the ground.

From Buffalo we motor eastward to Rochester, about seventy miles away. This city is connected with the New York Barge Canal, and is noted as a manufacturing center. During our stay we visit several factories to see how cameras and photographic supplies are made, and see men making also field glasses, opera glasses, and spectacles. On our way back to Buffalo, we pass many orchards, and learn that this region south of Lake Ontario is one of the chief fruit-growing centers of our country, where millions of bushels of apples, peaches, and pears are raised every year.

1. Name the five largest cities on the Great Lakes. Locate each and mention some of the things for which it is noted.

2. Give some reasons why Detroit is the center of our automobile industry. Visit a motor car factory and tell what you see.

3. Find out all you can about automobiles, motor trucks, and tractors and tell why they are needed. Of what are they made? Where are some of the more important materials produced? The iron? The rubber?

4. How is Detroit connected with Canada?

5. Why has Cleveland become a great manufacturing center? Find out from your history all you can about the War of 1812 and the battle of Lake Erie. What young American was the victor in that battle? When was Garfield President of the United States? Tell the story of his death.

6. Mention some of the advantages Buffalo has for manufacture and trade. What force operates the street cars?

7. Have you ever seen an airplane? Describe it and show how it works.

* * *

XXXVII. AT NIAGARA FALLS

WHEN we were high up in the air in our flying machines we could see bits of Lake Erie and Lake Ontario with the Niagara River flowing between. Niagara Falls is more than halfway down the river. It is only twenty miles from where we are now, and the electric trolley from Buffalo will take us there in a very short time.

The Niagara is a wonderful river. Only thirty-three miles long and less than a mile wide during most of its course, it is the downspout of all the Great Lakes excepting Ontario. Its waters have their source in Lake Superior, and we have seen how they pour out of that great basin into Lake Huron, uniting there with those of Lake Michigan and then sweeping on through the Detroit River into Lake Erie.

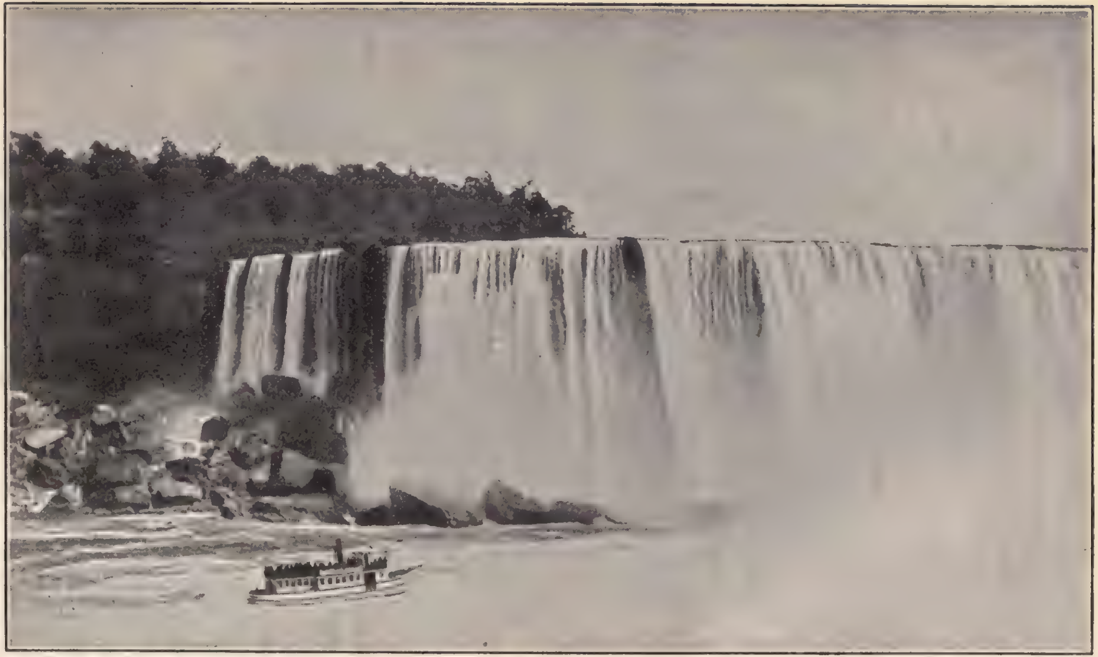
The Niagara River begins at the eastern end of Lake Erie and flows for about twenty-two miles before it takes its great jump at the falls. Where the waters flow from Lake Erie into the river the stream is as quiet as a mill pond, and the fall is not more than a foot to the mile. Going on, the waters soon divide and pass around Grand Island, at the lower end of which the river is two miles wide. After that the channel narrows and the rapids begin. One sees them boiling as they sweep over the rocks. They foam as they dash about Goat Island, on the edge of the falls, and then take their one hundred and sixty foot leap downward into the great abyss below.

For the next seven miles the river flows through a gorge about a quarter of a mile wide and two hundred to four hundred feet deep. In most of its course through this narrow channel its flow is about thirty miles an hour, or that of an express train on a railway. It gives out a mighty roar and its waters are churned about into whirlpools. They continue to seethe and foam until they pass Lewiston, at the end of the gorge, when they abruptly grow quiet and flow peacefully on into Lake Ontario.

When the falls first came into existence, the water fell over the cliff at Lewiston, and in the course of thousands of years the falls have worn their way upstream seven miles to their present position. The whole gorge has been chiseled out of the solid rock by the river. The falls are still slowly retreating, and in time will reach Lake Erie.

We hear the noise of the falls long before we reach them and get our first view at Goat Island. The American Falls on the right are as high but not so wide as the Horseshoe Falls which in the shape of a great crescent extend to the shores of Canada on our left.

What a dense spray rises from the water! How the



Niagara Falls. In the foreground is the *Maid of the Mist*, on which we ride almost to the foot of the cataract. This picture shows only one fourth of the falls.

waters thunder as they dash over the rocks! They bubble and seethe and foam in angry motion in their bed far below us. Now the sun comes out from behind a cloud. It darts its rays into the mist, and paints rainbows there. The rainbows change as we look, and new rainbows appear as the water spurts upward in a diamond spray.

We tarry awhile on the bridge above the falls, and a little later go to the Cave of the Winds. This cave is right under the falls, and we must have a costume and a guide before we can undertake the journey. We can get both for a dollar. We put on rubber coats and caps, and rude pantaloons. Our feet are shod with felt slippers, in order that we may not slip, for the descent is dangerous. Our guides take us down a wooden staircase along the rocks, until at last we are right behind the curtain of falling water and as we go into the cave the noise almost deafens us. While we stand there and look out, the sun peeps in through the spray, and we have a curtain of rainbows.

Another thrilling experience is our ride below the falls in the *Maid of the Mist*. This little steamboat has powerful machinery, which carries it over the boiling surface of the waters from one side of the river to the other.

We visit also the whirlpool and the rapids above it; and then take a walk over the steel bridge which here connects Canada with the United States. From it we get another fine view of the falls.

This bridge crosses the raging Niagara River. It is an arch of steel, one of the largest of its kind in the world. It carries, on top, two tracks for railroads, and below are wagonways, sidewalks, and trolley-car tracks.

The first suspension bridge was put across this gorge more than three quarters of a century ago, and it is interesting to know that boys aided in its construction. The civil engineer who made the plans wished to get a line from one bank to the other; so he offered a reward of five dollars to any one who could throw a string across the chasm. The next windy day, scores of boys with kites in their hands were on the American bank, and before night a lucky youth had landed his kite on the Canadian side.

To the kite string a strong cord was fastened, and this was pulled from one side to the other. Next, by means of the cord, a rope was drawn over, and a cable made of wires about as thick as a man's thumb was tied to it. The cable was then fastened, and an iron basket with pulley attached was hung on the cable, so that the workmen in the basket could be drawn from one bank to the other.

Soon after this, huge stone towers were built, heavy cables were carried across from one bank to the other, and little by little the bridge was constructed. The first railroad suspension bridge, built a few years later, has now been replaced by the magnificent steel arch upon which we cross to-day.

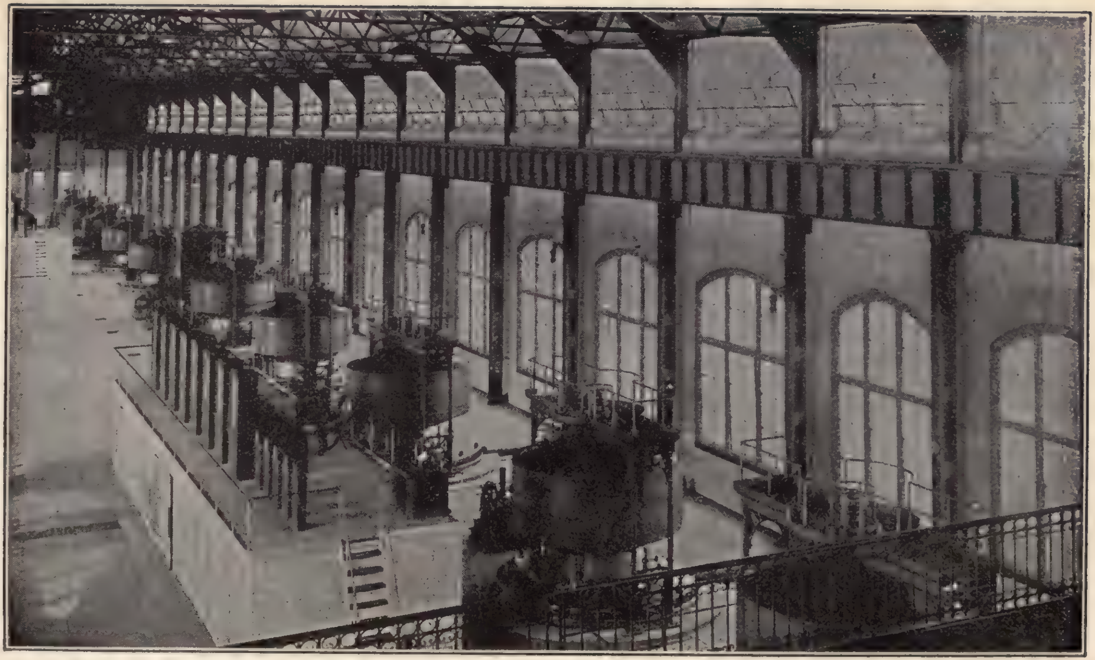
XXXVIII. NIAGARA IN HARNESS

GOING back to the falls, we sit down above them and watch the mighty cataract as the electrical engineers tell us how it is being harnessed to work for man. The Niagara River is the greatest water power known. The water pours out of Lake Erie at the rate of two hundred and eighty thousand cubic feet every second and it drops down over the falls at the rate of millions of tons every hour. The drop from the foot of Lake Erie to the foot of the falls is about two hundred and twenty feet. The force is so great that some of the engineers have estimated that it might develop seven million horsepower. That amount is equal to a large part of all the coal that we take out of our mines and enough to run thousands of factories and light and heat many cities and towns.

So far only a small part of this power has been allowed to be used, and most of that part belongs to the Canadians. The amount has been fixed by a treaty between Canada and the United States, whereby Canada is allowed to take thirty-six thousand cubic feet of the water a second while we can use only twenty thousand cubic feet a second.

But how can this be? It is because the Great Lakes are supposed to belong equally to both countries, so when the force at Niagara came to be divided, Canada insisted that to her share of one half should be added an amount equal to what the United States is taking out of Lake Michigan in the canal we have made to join that lake with the Illinois River, which flows into the Mississippi River and on to the Gulf of Mexico. Even at this we are using less than our share, as we do not wish to take away from the beauty of the falls by lessening the volume of water that passes over them, our total consumption being only about sixteen thousand cubic feet per second.

As our country grows and we need more light, fuel, and power, this question as to the use of the falls will become more and more important. The total power now going to waste every year equals many million tons of coal. The black coal once burned cannot be replaced, but this white coal, as water power has been named, comes on just the same year after year. Therefore, some think we ought to get more power from Niagara, and save our coal for the future.



Dynamos at Niagara Falls. Each is run by a turbine far below it.

And now let us see what Niagara in harness is doing. The amount so far employed by both countries is less than a half million horsepower, but this serves to run many great factories at Niagara and to light and give power to cities and towns many miles from the falls. By means of the cheap electricity so generated, one factory at Niagara makes a grinding material called carborundum, which takes the place of grindstones, emery, and diamond dust. The material might be called artificial diamonds, for it is composed of countless little crystals, so hard and so sharp that they can grind almost any material. They are used to grind the hardest of steel, and are so important that it is said we could not make automobiles, airplanes, and many of our steel tools without them. This product is made of sand and coke melted together by electric heat.

Artificial graphite, used in smelting and refining and as a lubricant, is another important substance made at Niagara, as is also the carbide which gives us acetylene. Many of us have seen acetylene gas lights, and some may have seen the acetylene flame made of the gas combined with oxygen. It is so hot it will melt the hardest of steel almost as soon as it touches it.

The very light and strong metal, aluminum, used in cooking utensils and in building airplanes, is extracted from the ore by the electricity generated at Niagara. Chlorine for bleaching paper and clothes is also made, as well as chemicals and drugs, and many alloys or combinations of iron and other metals, all requiring high electric heat which is cheaply created by the power at the falls.

Leaving the falls, we walk up the river to look at the power plants in which the water is harnessed. They remind us of the works we saw on the Mississippi at the Keokuk Dam. The water is taken from the Niagara

River in canals and dropped down through penstocks or immense steel tubes upon turbine wheels in such a way that it drives them around, and they move the dynamo overhead. Each penstock is as tall as a building of sixteen stories, and its diameter is such that if it could be laid on the ground a horse could trot through it without dropping his ears. The dynamos look like giant mushrooms of black steel and they are turning so fast we cannot see them move. Their speed is almost two miles a minute, so fast that each is generating an electric force of five thousand horsepower. It makes us think of five thousand horses galloping at a speed faster than has ever been made on any race track.

Much of the power generated here is taken by the City of Buffalo to run its electric railways and for other purposes. Some is used by the New York State Barge Canal. The electricity is carried by thick cables to the places where it is used.

Great factories have sprung up also on the Canadian side of the river, manufacturing products similar to those we have just seen. The hydroelectric works there can create almost a half million horsepower.

1. Locate the Niagara River. How long is it? Where do its waters come from?

2. Make an imaginary trip to the falls and describe what you see.

3. What part had a boy's kite in building the first bridge at Niagara?

4. Give some idea of the power of the falls. What part of the force now used belongs to Canada? Why has Canada the right to more than the United States has? What is a treaty and why do governments make treaties?

5. Visit one of the power plants and show how the waters are harnessed.

6. Name some of the products made at Niagara and mention some of the uses of each. Why are they made at the falls?

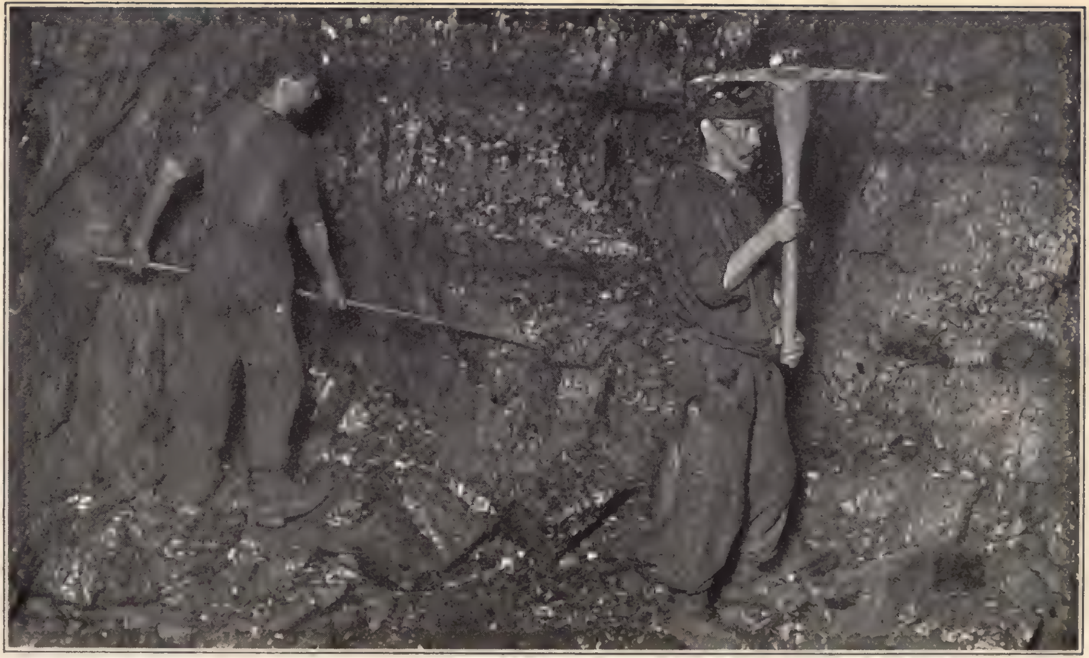
XXXIX. IN THE COAL REGIONS

AFTER returning to Buffalo we have come by train to Scranton, Pennsylvania, in the basin of the Susquehanna River. The ride takes all day, and when we leave the cars we are in the heart of the anthracite region.

Coal is of several varieties. Bituminous or soft coal is black and easily broken, and when burned it gives off a dense smoke and leaves a great deal of ash. It is the coal from which we get most of our steam, and which we use for manufacturing, smelting, and the making of coke. Anthracite is a hard coal of a high grade, which is used more for heating. It makes a very hot fire; it burns almost without smoke and with a moderate amount of ash. It is found in large quantities in northeastern Pennsylvania, and in the province of Shansi in China. Smaller quantities exist in England, France, and Belgium. Bituminous coal is among the mineral resources of every continent, and of many countries. Anthracite is comparatively rare.

But first let us learn a bit more about this dirty black stuff upon which we rely so much for our heat, light, and power. Take up a chunk of coal and ask it to tell you its story. It replies that its life began ages ago, and that it first lived as trees, mosses, and other vegetable growth. It tells how it was covered with sediment and put under such pressure that it finally hardened and became coal. It tells us that coal is good according to the amount of carbon in it, and that anthracite has the most carbon of all. Bituminous has less, and lignite, a low-grade brown coal, has so little that it is seldom profitable to use it for heating or the making of steam.

There are many interesting stories of how men first



In an anthracite mine. The man at the left is boring a hole into the coal for blasting.

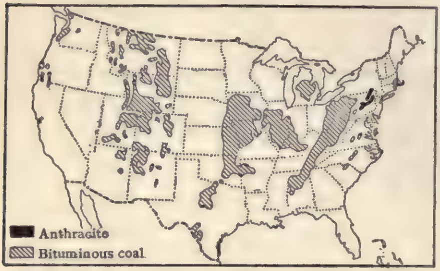
found that coal would burn. One comes from Belgium, the little country which had such an important part in the World War. It tells of a blacksmith who was smelting iron with charcoal, as was the custom in those days long ago. The blacksmith was poor, and he had to burn wood to make his own charcoal. This took so much time that he was not able to earn enough to support his family. He was about to kill himself in despair, when a white-bearded old man came into his shop and told him to dig the black earth out of the mountains near by and burn it. He did so, and was able to make a horseshoe at one forging.

Another story relates to the discovery of anthracite. This tells of a hunter named Allen, who in pioneer days was camping one night in the region where we are now. He built a wood fire on some black stones, and roasted a part of the deer he had killed. He then lay down by the fire, and dropped off to sleep. He woke to find himself almost burning up. The stones were red hot and they gave forth a light blue flame. Pennsylvania anthracite was burning for the first time.

Shortly after that a company was formed to sell the new coal in Philadelphia. But the people there had been used to soft coal, and did not know how to light the anthracite. They could not make it burn, and thinking they had been cheated, got out a writ from the city authorities denouncing the sellers of anthracite as knaves who were trying to impose rocks upon the people for coal.

The first bituminous coal found in America was discovered near Ottawa, Illinois, in 1679. Later, coal was discovered near Richmond, Virginia, by a boy wading in a small creek, when he stumbled on the outcroppings of the James River coal beds. The first coal mines of the United States were worked there.

Since then coal has been found in greater or less quantities in almost every state of the Union. It is mined for sale in large quantities in twenty-five states, and in far-off Alaska; and we are told we have in our territory about half of all the coal of the world. Just before the World War a congress of expert geologists from many countries met in Toronto, Canada, and figured out the coal beds of each continent. They estimated that the total amount is more than eight thousand billions of tons, of which, in round numbers, North America has about three fourths. According to their estimates our own coal reserves are over four thousand billions of tons, which is more than three times as much coal as that of all Asia and five times as much as that of the whole continent of Europe. Australia and Africa put together have less than one fifteenth as much as the coal reserves of the United States, and the only countries which have anything like our vast beds of coal are Canada and China. Canada has about one third as much as we have and China less than one fourth. Inasmuch as the wealth and power of a country and its growth in manufacture and commerce depend largely upon its coal, it will be seen that we have a better chance to succeed than any other nation.



Coal regions.

Four thousand billion tons! Our minds reel as we try to comprehend what it means. According to the estimates of Dr. Marius Campbell, an expert of our Geological

Survey, the amount is so great that if our workable coal could be dragged out of the earth and put in one solid pile it would form a block more than eighteen miles long, eighteen miles wide, and eighteen miles high. Such a block would make a wall of solid coal a half mile in height, a mile wide, and long enough to extend clear around the United States and still leave enough to reach from New York to Chicago. Of this vast amount we have already mined not as much as one per cent, so that we have enough left to last us for hundreds of years.

XL. WE VISIT A COAL MINE

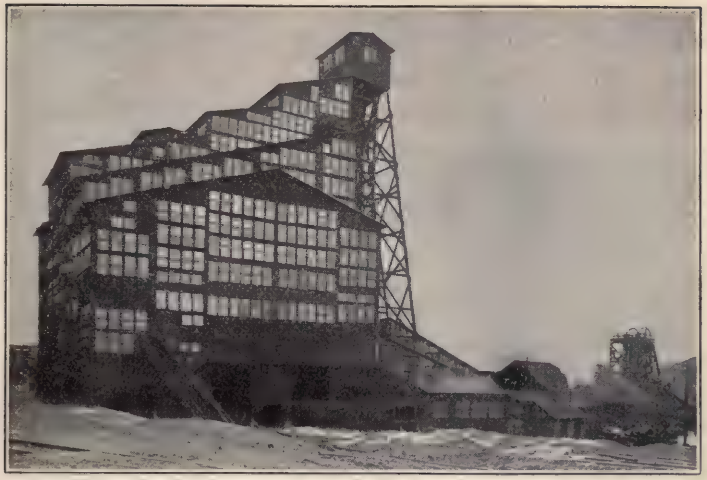
DURING our stay in Scranton we visit an anthracite mine. It is more than one thousand feet deep, and so many tunnels have been cut out of the coal that we can ride back and forth on the electric railroads within it for a distance of eighty-five miles. The mine is lighted by electricity, and enormous electric fans run by steam engines drive fresh air through its tunnels. We each have an acetylene hand lamp, as well as a little lamp filled with oil, such as the miners wear on their caps. We may go into some of the dark rooms of the mine, and must be provided against any failure of the current of electricity.

Leaving the shaft at the bottom, we find ourselves in a city of coal. The tunnels are the streets and the chambers or rooms on each side, out of which the miners are taking the anthracite, are the houses. In them we see the miners boring into the black walls with drills worked by compressed air. After a hole is drilled they put in a blast, and later a series of explosions brings the great walls

Miners about to ascend to surface in shaft cage. Each man wears a lighted lamp on his cap.

of coal to the floor. It is then put on the cars and carried to the shaft, up which it goes to the breakers.

As the anthracite comes from the mine it is mixed with quantities of stone, slate, and dust. It must be broken up and picked over before it is ready for sale. The breaking is done in a huge building almost as big as the grain elevators we saw at Minneapolis. The loaded cars run from the shaft into the building, and mechanically at the top of the breaker the coal is dumped upon moving bars, which throw out much of the slate and other refuse, and sort the coal into sizes. As the coal goes on it passes through crusher after crusher, and through machinery



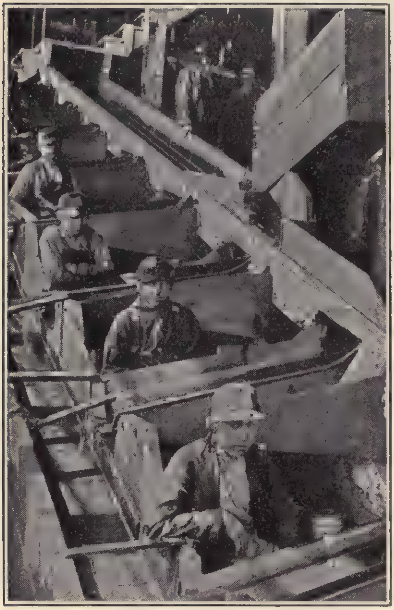
A coal breaker. The coal is carried to the top of the building, and is crushed and sorted as it moves downward.

which removes more and more of the slate. In some cases it is run through water, and it is also picked over by boys.

Coal is sold in eight different sizes, ranging from that of a grain of barley to great lumps. The larger coals, such as broken, egg, stove, and chestnut, are used mostly for heating, while the pea, buckwheat, rice, and barley coals are used more for the making of steam.

Leaving the anthracite region, we motor through the Appalachian Mountains westward towards Pittsburgh, passing many bituminous coal fields on the way.

Most of the good coal of our country is bituminous. The Appalachian coal bed extends from northern Pennsylvania down through these mountains into Alabama. It is eighty or ninety miles wide, and is one of the largest and richest of all coal deposits. We have another enormous bed of soft coal in Illinois, Indiana, and Kentucky, and others in the central and southern parts of the Mississippi basin west of that river. There are quantities of bituminous coal in Ohio, North Dakota, Wyoming, and Colorado, and in Washington, Montana, and Utah. Immense beds of soft coal are found in Alaska.



These breaker boys pick pieces of slate out of the coal (page 289).

The coal mine we shall visit is not far from Pittsburgh, from which city a great deal of coal is shipped, both by rail and by river, to many parts of our country. Leaving Pittsburgh by boat, we ride up the Monongahe'la River, seeing the black beds of coal standing out between the rocks on the banks. Here and there are dark blotches showing in the green walls of the hills. Each blotch is the mouth of a coal mine, and the little village below it, with its dirty black houses along the narrow streets, is the home of the miners.

See those cars, drawn by mules, coming out of that hill! Watch them as they run down the inclined railroads and discharge the coal into the barges below. For half a century the miners have been taking coal out of these mines, and the beds are by no means exhausted.

Leaving our boat, we enter one of the mines and pass through tunnel after tunnel, our way being lighted by the lamps on our caps and those on the caps of the miners. Some of the men are covered with dust. They look like black ghosts in the dim light.

Notice how the tunnels are propped with timbers, and how the water drips down as we pass through them. Here and there are huge pumps run by steam to take the water out of the mines. In wet mines like this there is often so much water that if the pumps should stop the mines would become flooded and the miners would drown.

Look behind you and jump to the wall! Here is a car coming. It is hauled by a mule which goes on the trot. In many other mines the cars are moved by electricity and the tunnels are lighted by long lines of electric lights. Beside the tunnels there are many rooms or chambers much like those we saw in the anthracite mines. The methods of mining also are much the same, although there are no great coal breakers such as we saw at Scranton.

According to the laws passed by our government great care must be taken in mining. There are laws about ventilating and draining the mines, and for preventing the explosions of fire damp, other gases, and dust, which with a clap like thunder, sometimes send a whirlwind of flame through the tunnels, pulling down the timbers and caving in the walls. At such times the miners are blinded, scorched, and perhaps burned to cinders, hundreds being killed at one time. Some of the dangerous gases have no smell and to detect them canary birds are sometimes carried into the mines. When the birds begin to droop or look sick the miners know the air is not right.

XLI. PITTSBURGH — A GREAT WORKSHOP OF IRON AND STEEL — HOW COKE IS MADE

WE are in Pittsburgh this morning, in one of the richest coal fields of the world. Situated in western Pennsylvania, where the Monongahela and Allegheny (ăl′e-gā-nĭ) rivers flow together to form the Ohio, and within a short distance by railway of the ports of the Great Lakes, Pittsburgh has great advantages for the making of iron and steel and for exporting its coal and other products to all parts of the United States and the world. The city has three navigable rivers and nine trunk lines of railway, and the cheap transportation of the Great Lakes brings the rich iron ore of Minnesota, Wisconsin, and Michigan almost to its doors. There is limestone near by, and so Pittsburgh can easily get everything needed for the smelting and making of iron and steel.

There are three hundred and fifty bituminous coal mines within a few miles of Pittsburgh and when all are working they produce annually more than one hundred million tons of this fuel. The coal goes out on the railroads in tens of thousands of tons every day. It is carried down the Ohio and Mississippi in long fleets of barges. It travels up the Great Lakes in enormous steamers; and it is used by the millions of tons in and around Pittsburgh for the manufacture of all sorts of things made of iron and steel.

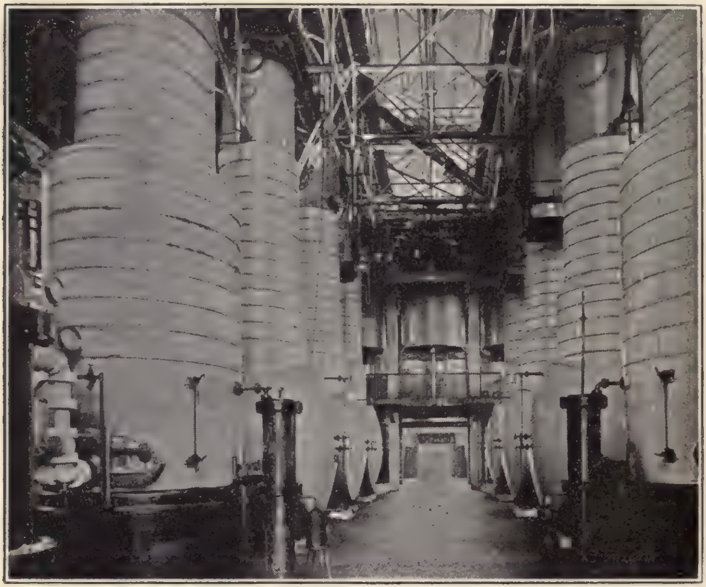
At the time of our visit Pittsburgh is making more than one fourth of all the pig iron of the United States, and it has more than one hundred thousand men employed in its steel mills. Over forty-five thousand miners are employed in the coal district, and more than half of all the coke produced in the United States comes from here.

This matter of coke is important. Coke is the form in which coal is most commonly used for the smelting of iron. It is bituminous coal with all the volatile gases and other impurities roasted out of it, so that what is left consists chiefly of carbon, or the heat-producing element in the hot fire needed for smelting. We can see how this is done by going to Connellsville, a short motor-car ride from Pittsburgh. The coal there yields about sixty-two per cent coke when roasted in what is known as the beehive coke oven; the remainder goes out in gases and drifts away in the air.

In this process the coal is dumped into openings in the tops of the ovens. When an oven is full the door is sealed up, except for an inch at the top, and the coal is then lighted. It soon becomes red hot, and the heat is intense. The ovens are so made that very little air can reach the coal, and it burns in such a way that the gases in it are all driven out, leaving chunks of a light, hard, porous or spongelike material, which burns easily and with a great heat. This is coke. The coke is cooled by letting cold water into the top of the oven, after which it is ready to be loaded upon cars for the furnaces.

This is the old method of making coke. It is very wasteful, for the twenty-eight per cent of the coal that goes off in the shape of gases contains some of the most valuable materials needed by man. In the first place, the gases themselves can be used for heating and lighting; and treated in a certain way they yield benzol, which is much like gasoline; toluol, which is valuable for explosives; and ammonium sulphate, one of our most valuable fertilizers. Some of our important drugs, dyestuffs, and other chemicals are made from these gases, which, until a few years ago, all went to waste.

Now we have what are called by-product coke ovens, which save seventy-five per cent instead of sixty-two per cent of the coal and at the same time turn the remainder into gas, ammonia, benzol, and tar. The new ovens are like huge steel drawers placed on their sides close together. The gases are carried off into tanks and made into benzol and other things, and the red-hot coke is then put into cars in which it is flooded with water, making a volume of steam which reminds one of a volcano in an eruption.



Inside a by-product plant. Benzol is made here from coke gases.

During our stay in Pittsburgh we follow the processes of making the iron ore into pig iron, in which form it can be kept and afterwards used for steel making. In making pig iron the ore is put into the blast furnace in layers sandwiched between layers of limestone and coke. Then a hot blast is introduced from below, which turns the contents of the furnace into a boiling, bubbling mass of liquid fire. The blast has been first heated in what are known as the stoves — huge towers which will withstand a temperature of 1000 degrees Fahrenheit. The air is heated to this temperature and then is blown into the furnace at a pressure of twenty pounds to the square inch. During the boiling, the impurities in the iron ore unite with the melted limestone, forming a slag which floats on the top as foam floats upon water. The melted iron, which is heavier, sinks to the bottom. The furnace men can tell just where the slag ends and the iron begins. They make a hole at that point in the side of the furnace, out of which the slag runs, leaving the iron.

After all the slag has been taken away, a hole is made in the side of the furnace at the bottom of the mass of molten iron, which flows out in a golden stream, and is conducted into a bed of sand which looks for all the world like a garden ready for planting. It is covered with little hollows or molds. Each hollow is about the size of a stick of stove wood. The yellow stream flows into the molds and soon the garden is a flaming surface of bright yellow. As the iron cools it darkens and finally changes to gray. Each hollow contains what is known as an iron pig. The pigs are soon cold enough to be dragged out of the sand, and are then piled into stacks ready for shipment, or for use in the mills near by for all kinds of manufactures of iron and steel.

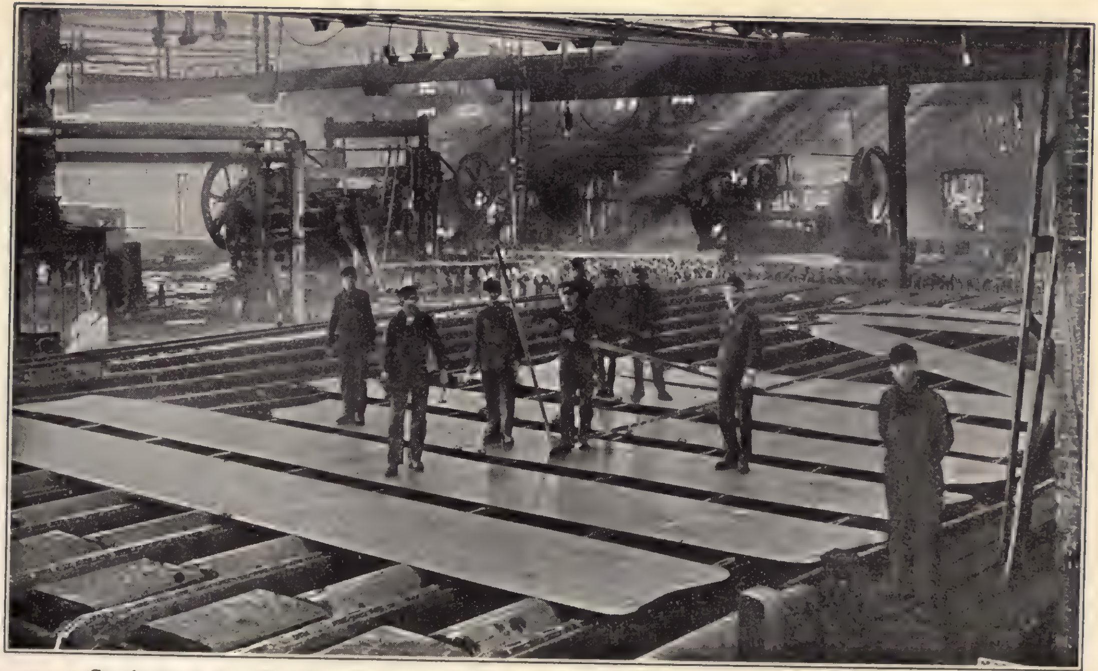
We shall now see how pig iron is turned into steel. The molten iron may be taken as it flows from the furnace

Pouring slag from a blast furnace. It is carried away and made into cement, fertilizers, and other products.

without turning it into pigs, or the cold pigs may be put into another furnace and melted again. The molten pig iron is drawn out from the furnace into huge ladles, each holding twenty tons. The ladles are upon car wheels, and they are carried by a locomotive on a railway to a great brick-lined oven of steel, which will hold the contents of about thirty ladles. This oven is known as a mixer, and its purpose is to mix the pig iron thoroughly with some other metals which are put in to improve the steel. The ladles are lifted by steam cranes, and their boiling, bubbling contents poured into the mixer.

After this the iron goes to the Bessemer converter, where more of the impurities are taken out, and the molten mixture made into steel. The Bessemer converter is an egg-shaped steel barrel, so large that it might serve as a bath tub for an elephant. It is lined with material that will withstand great heat, and is hung on pivots in such a way that it may be turned back and forth or tilted at various angles. The barrel is so made that an air blast can be forced in at a pressure of thirty pounds to the inch. As the air roars through the molten mass it takes out the impurities and turns them into gases which burst forth from the top of the converter in millions of sparks, forming giant sky rockets, which grow and grow until the sparks join together in flames. As the blast continues, the flames rise higher and higher, reaching up and licking the steel roof far overhead. The torch of flaming gases is now ten feet or more in diameter. It makes us think of a volcano of living fire. The heat is about three thousand degrees Fahrenheit. It is so great that at the end of twelve minutes the impurities have been reduced to gases and blown out, and the liquid iron has become liquid steel.

After this the steel is poured by machinery into molds,



Steel plates in a Pittsburgh mill. The ingots are made into these sheets by giant rollers.

forming ingots. Each ingot is a great block of steel about a foot square and four or more feet in height. It is the raw steel of commerce, and is run through rolling mills and other machines to turn it into the bars, plates, and thousands of steel products used in our industries.

A large part of the steel of commerce goes into the making of steel rails. In this process the ingots, which have been cut into pieces, or blooms, and again heated white hot, are passed back and forth between steel rollers, which press and mold the metal as though it were putty. As the bloom enters the rolls, it is a great thick block of hot steel, and when it leaves them it is a steel rail ready to be laid on the track. All this work is done by massive machinery with little man power. We get some idea of the capacity of one of the mills when its foreman tells us that the steel rails it makes in one day would be sufficient to lay ten miles of track, and that within one year it would furnish enough for a railway reaching from the end of Cape Cod on the Atlantic to the Bay of San Francisco, on the opposite side of the continent.

In the past the slag of the furnaces all went to waste. It is now used to make cement and fertilizers. As the slag cools, after it comes from the furnaces, it is as hard as stone. It must be reduced to a powder before it can be used. This is done by means of a huge ball of steel as tall as a man and weighing fifteen tons. How do you think the great mass can be raised high into the air and dropped upon the slag to crush it to powder? The raising is done by a crane, with the aid of an electric magnet, after the same principle as that of the horseshoe magnet with which one lifts tacks. The electric magnet is so powerful that as it touches the top of the steel ball it becomes almost a part of the metal, and when it is drawn up by the chains attached to the great crane above, the ball rises. When the ball has reached the right height, the man in the crane moves a lever which shuts off the electricity, and the huge mass of steel drops with a crash on the slag. Similar magnets are used in lifting steel rails and moving them about. Two of them moved by a traveling crane overhead will lift up fifteen rails at one time and lay them down on the cars.

We shall learn more about steel as we travel in other parts of the United States. The chief centers of the steel industry, besides Pittsburgh and Birmingham, are Chicago, Cleveland, Toledo, Detroit, and other cities on the Great Lakes, where the iron ore from Lake Superior can be easily brought.

We spend some time at Pittsburgh seeing its many industries of one kind or another. We go from the various steel mills, in which one hundred thousand men are em-

Barge loads of pipe from a Pittsburgh factory starting down the Ohio River on their long journey to New Orleans.

ployed, to the factories making tinplate, which are also enormous. We spend some time in the glass works, where men are blowing window glass by machinery, and wander through a great electrical manufacturing plant that has a floor space of one hundred acres.

Pittsburgh has the largest cork mill of the world. The cork comes from the bark of an oak tree in Portugal. The bottle stoppers made here go out to all parts of the world, and we may use one of these very corks when out fishing some day.

Pittsburgh makes locomotives and steel cars for our railways; it makes structural steel for our large office buildings, and steel for bridges, some of which is exported to Asia and Africa. It leads all other cities in the manufacture of aluminum, a soft, light, white metal made from some kinds of clay, and of vanadium, a metal found in the high Andes, and valuable in steel making. The city is indeed a beehive of industries and the country for miles about teems with factories.

1. Where does coal come from? Mention the two most important varieties and some of the things for which they are used.
2. Bring a lump of coal to class and let it tell its life story. How did a boy discover the Virginia coal mines?
3. Point out on a map of the United States the location of our coal regions. Compare them with the coal beds of the world. Of the continents. Of other coal countries.
4. Where is our principal anthracite coal region? Where do we find bituminous coal?
5. Visit a mine and tell what you see.
6. Ship a cargo of coal by water from Pittsburgh to New Orleans, describing the route. From Pittsburgh by rail and water via Cleveland and Duluth to St. Paul.
7. Locate Pittsburgh, and show why it is a great iron and steel manufacturing center.
8. What is coke and how is it made, by the old method? By

the new method? What advantages have the new method over the old? Mention some of the by-products saved by the new method of making coke.

9. How is pig iron made?

10. Take a trip through a steel plant and tell what you see. Find out all you can about our iron and steel industry. (See Carpenter's "How the World is Housed," pages 142–163.)

11. Find out all you can about glass and how it is made. (See Carpenter's "How the World is Housed," pages 188-204.)

12. Where does our cork come from? (See Carpenter's "Europe," page 485.) Trace a shipment of cork from there to Pittsburgh, coming from New York by rail. About how far does it travel?

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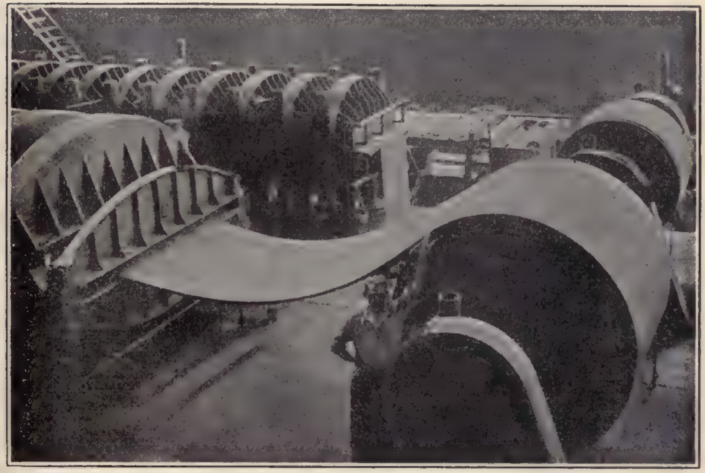
XLII. AKRON AND THE RUBBER INDUSTRY—CINCINNATI, LOUISVILLE, AND INDIANAPOLIS

WE might take a steamer at Pittsburgh and go with the coal barges down the Ohio River to Cincinnati. The country is more hilly than along the lower Mississippi, the farms are smaller, and there are manufacturing towns near the river fed by the coal, oil, and gas fields of Pennsylvania, West Virginia, Ohio, and Kentucky. At East Liverpool, Ohio, beautiful china and pottery are made from the white clay near by, and Wheeling and Bellaire (bĕl-âr′) manufacture glassware, including millions of bottles of all sizes and shapes. Further downstream is Point Pleasant, where General Ulysses S. Grant was born, and still farther on is Georgetown, where he worked on his father's farm.

We should find the trip interesting, but there are other things more important, and we decide to motor about through northern Ohio and go to Cincinnati by rail. Leaving Pittsburgh, a ride of three hours takes us to Youngstown, another steel-making city in the Ohio coal region, and an hour more lands us in Akron.

We are now in what might be called Rubberopolis. Akron is the chief rubber-manufacturing center of the world. It has more than twenty factories which make things of rubber, and the rubber tires made each year for motor cars and trucks and for motor cycles, bicycles, and airplanes count up to millions. Indeed, the motor traffic of to-day is cushioned in Akron. There are other departments of the factories which make rubber sheets, and belts and conveyors such as we saw carrying the grain in the wheat elevators, and others which make hot-water bottles, boots and shoes, diving suits and raincoats, ink and pencil erasers, elastic bands, and balls for tennis and other games. Indeed, there are more than thirty thou-



Making rubber belting in an Akron factory.

sand different articles in which rubber is used, and the principal ones are made here.

We can learn all about rubber in Akron, for it has rubber experts from all parts of the earth. They tell us that some of the world's rubber comes from the wild trees of the forests of the Amazon valley, but most of it from the cultivated trees in the plantations of Ceylon, Java, Sumatra, and the Malay Peninsula. They show us photographs of men gathering rubber, and tell us it is the latex or juice from the bark of the trees. The trees are tapped so that the juice oozes out. It is collected from day to day and smoked, or cured in other ways, and made into great lumps or sheets for the market.

An army dirigible balloon made at Akron. It is of finest rubber and is filled with gas. The bag is 200 feet long.

The rubber men take us through the factories where the crude rubber is softened in vats of hot water, and then crushed between great rollers of steel so that it comes out in sheets. It is next washed to get out the dirt. It is crushed and kneaded and cleaned by machinery again and again. It is treated with sulphur and other materials until it has the right texture and form needed for rubber goods.

Each kind of goods requires its own process of preparation and making, and there are so many different things going on that we might spend weeks and not see them all. The best rubber tires are made of cloth, cord, and rubber so put together that they will stand the wear and tear of thousands of miles of hard travel.

Leaving Akron, we motor to Canton, another manufacturing city, noted also as the home and burial place of President McKinley, and then go by train to Columbus, the capital of Ohio, and a busy industrial center owing to the many railways and the coal, iron, and natural gas fields near by. We visit the old stone State House, passing the monument to President McKinley on the way in, and taking a look at the group of statues at the northwest corner. The group is called Ohio's Jewels, and the statues composing it are those of Grant, Sherman, Sheridan, Chase, Stanton, Garfield, and Hayes. Three were presidents of the United States; three were famous generals of our Civil War; Chase was chief justice of the Supreme Court; and Stanton was Secretary of War under Lincoln. All were born in Ohio. We wonder if the statues of President Benjamin Harrison and President Harding will some day be added; for they too were born in this state.

The trip from Columbus to Cincinnati is through a rich farming country, with manufacturing towns and villages at every few miles. On the way we pass through Dayton, where we see the airplane factories founded by the Wright brothers, who made the first successful flight of a heavier-than-air flying machine. Here also are made cash registers, which are used all over the world.

Cincinnati has so many factories and foundries that it reminds us of Pittsburgh. It is located on the Ohio River and has many trunk lines of railway which go out in every direction. The city is built upon a terrace surrounded by a semicircle of hills, upon which the finest residences stand. We take motor cars and ride up the hills for a view of the city. It covers all together seventy square miles, and the buildings run for twenty-two miles along the Ohio.

A night's ride on the steamer lands us in Louisville, the largest city of Kentucky. It is noted as a tobacco center, and it has factories of other kinds. During our stay we go outside the town to see the grave of President Zachary Taylor, who was buried near his old home five miles away, and we wish we had time to visit the log cabin in another part of the state where Abraham Lincoln was born. We should like also to see Mammoth Cave, which is one of our natural wonders. It consists of a series of underground halls many miles long, with some chambers or domes almost half as high as the Washington Monument. Passages and avenues lead from room to room, and there are several streams flowing through the caverns, one of which passes under a beautiful natural bridge.

Leaving Kentucky, we cross the Ohio River, and three hours by train brings us to Indianapolis. It is the capital of Indiana and an important railroad and manufacturing center. It is here that Benjamin Harrison, the twenty-third president of the United States, lived, and here James Whitcomb Riley wrote "The Raggedy Man," "Little

Orphant Annie," "The Old Swimmin' Hole" and others of his poems. We visit the house where Riley lived, and then look at the statues of some of Indiana's great men in Monument Place. We walk through the state capitol, drive about through the beautiful residence section, and then take a train for Chicago.

1. Write a list of a dozen articles in which rubber is used.
2. Bring a rubber ball or pencil eraser to class and let it tell the story of its adventures. In what city are most of our rubber goods made? (For further information about rubber see Carpenter's "South America," page 343, and Carpenter's "How the World is Clothed," pages 240-261.)
3. Name six important towns of Ohio and tell for what each is noted.
4. Why is the group of statutes at the State House in Columbus called "Ohio's Jewels"? What Presidents were born in Ohio? What other state was the home of many Presidents?
5. Locate the chief commercial center of Kentucky. For what is it noted? What President is buried near this city?
6. Make an imaginary trip to Mammoth Cave and describe it.
7. What poet lived in Indianapolis? What President? Tell all you can about them.

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XLIII. CHICAGO

WE must wake up this morning and keep our eyes open. We are in one of the liveliest and most enterprising cities on earth. Chicago is second in size among the cities of the United States and it is surpassed only by New York, London, and Paris in all the world. By the census of 1920 it had more than twenty-seven hundred thousand inhabitants, or more people than any one of thirty-six states of the Union. The city does more business than many of our states, and its streets and alleys if joined together would reach farther than the public roads of many of them.

Chicago is the chief distributing center of the interior of the United States. Forty per cent of our railway mileage terminates here, and the Great Lakes also give the city access to a vast population in this country and Canada, forming a waterway to and from the ocean. The wholesale trade of Chicago is three or four billion dollars a year. It is the chief live-stock, grain, and lumber market of the world, and one of its greatest manufacturing centers. It has eleven thousand industrial establishments and produces goods every year to the amount of more than one billion dollars.

Chicago is a baby among the great cities of the world. Boston and New York were more than two hundred years old when it was founded, and London and Paris were not far from two thousand years old. The first settlement in Chicago was made about 1830, and as late as 1843 the city council enacted a law that hogs should no longer run at large through its streets. In 1837 it had only four thousand inhabitants, and for long after that time, the place where the biggest buildings now stand was a swamp and the ground was so wet that no cellars could be dug. The swamp came right down to the lake, just where the people wanted their city.

What the people did shows the enterprising spirit of Chicago, a spirit that has aided greatly in making it the city it is to-day. They decided that the town must have a solid foundation, so they lifted their houses on stilts and brought in earth from the country about. As the city grew they drove piles down to make the foundations and erected buildings upon them, and later invented foundations of steel and concrete so designed that they would support the great buildings above. In this way the height of the land near the lake was raised fifteen feet, and the huge structures upon it are as firm as those of New York. Indeed, no one would imagine that the land here had ever been a swamp.

In addition to the huge buildings on the surface, Chicago has constructed a network of tunnels far under the ground. Some of the tunnels are for electric light and power, some for telegraph and telephone lines, and some for the freight traffic, which is so great that it cannot all be accommodated above.

The water supply comes through pipes from cribs two miles out in the lake, in order that the purity of the water may not be affected by the refuse near the shores. This is considered so important to the health of the city that people have turned the Chicago River figuratively speaking upside down and made it carry the sewage to the Mississippi system and so to the Gulf of Mexico. The river at one time flowed into the lake, but by means of the Chicago Drainage Canal its waters now go into the Illinois River, which flows into the Mississippi. At some time in the future these waterways may be made into a ship canal which will bring the traffic of the ocean via the Gulf to Chicago. We have already seen at Niagara how the Canadians claim that some of our share of the waters of the Great Lakes thus passes off into the Gulf of Mexico, and how we are taking less of the power of the falls on that account.

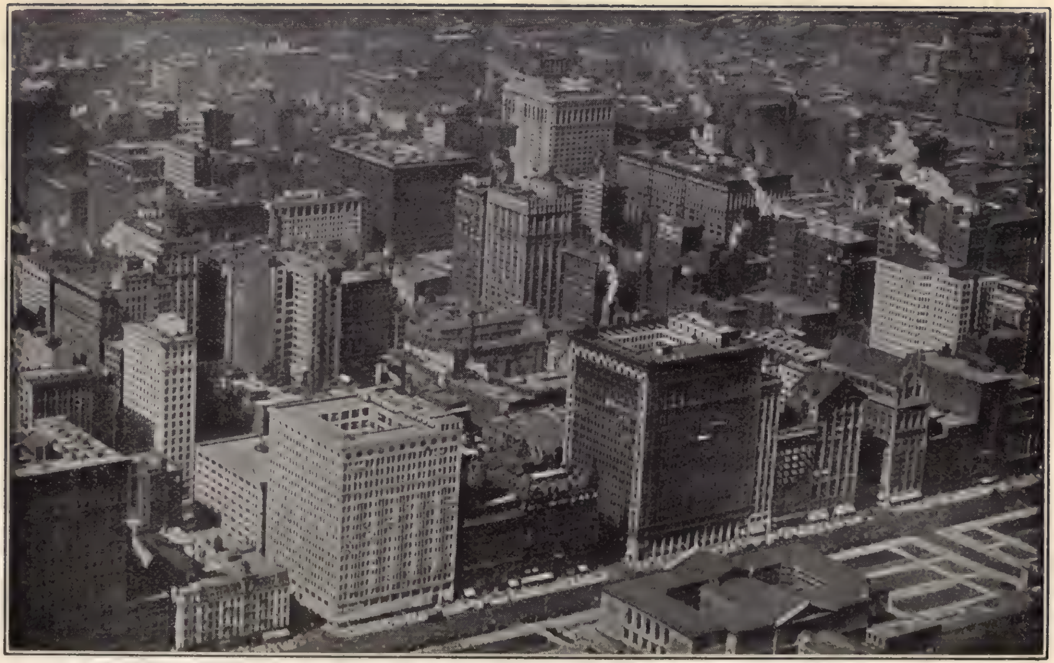
But why has such a great city grown up at this point? The answer is that Chicago is located at the place farthest southwest on the Great Lakes in the heart of the corn belt, and at the cross roads between the industrial East and the agricultural and ore-producing West; it is within easy access of the cotton fields of the South, and the great iron and copper mines of the North. The city has the cheapest water transportation and the best railroad facilities. There are vast coal deposits just south of it, and it is within easy reach of the Appalachian coal mines. It

Swimming pool in Chicago.

has cheap copper and iron ore from about Lake Superior, and lumber from the forests about the Great Lakes. It receives enormous supplies of grain by water and rail. As a result of these things Chicago is one of the best places in the world in which to do business and to make things to sell. In South Chicago, and Gary near by, are steel plants quite as wonderful as those we saw about Pittsburgh, and in some parts of the city are plants making machinery which are greater than those of any other country. One such factory turns out a reaper and binder every minute throughout the day. Another section of the city is devoted to making steel cars, others to elevators and grain and flour mills, and others to the great meat-packing establishments which we shall see later on.

We choose one of the sight-seeing automobiles for our tour through Chicago. Seated high above the rest of the vehicles, we spend a day in riding over the magnificent boulevards along the lake and out through the parks. The city is almost surrounded by parks, every one of which has baseball grounds, golf links, and tennis courts. There are so many places for bathing that it is said every boy in Chicago lives within easy walking distance of a swimming-hole of one kind or another.

Near the center of the city, we cross the Chicago River. The bridge is as busy as the one which crosses the Thames (tĕmz) in the heart of London. Riding on, we find ourselves in the loop district, which is perhaps the most thickly populated business section of the world. Here in a space not larger than a farm of one hundred and sixty acres, shut off by the river, the lake, and the railways, a quarter of a million people are at work every day and almost two millions walk through the streets. The buildings are of enormous size. They remind us of the huge structures of



Airplane view of Chicago's lake front, showing the chief business section of the city.

lower New York. The loop has nineteen streets, nearly all of which have street car lines on them. We are told that more than twenty thousand street cars and one hundred and thirty thousand vehicles pass through every day.

Going on through the business section, we cross Washington, Madison, Jefferson, and Adams streets, and the guide shouts out through his horn that they were named after the Presidents. He adds that a boy asked him the other day how it came that the Presidents of the United States were named after the streets of Chicago. We laugh with him. The guide says that Chicago is famous as a convention city, and that the national conventions which nominated Lincoln, Grant, Garfield, Cleveland, Harrison, Roosevelt, Taft, and Harding for President were all held in Chicago.

Leaving the business part of the city, we visit some of the manufacturing sections, watching the workmen as they go in and out. We are surprised to see so many foreigners. A large part of our immigrants have come here to work, so many indeed that we are told that about three fourths of the people ot Chicago are foreign born or children of foreign-born parents. The city has about four hundred thousand Germans, more than two hundred thousand Poles, and an almost equal number of Russians. It has many Irish, Swedes, Italians, Scotch, English, and Danes. It has Bohemians from Czechoslovakia, as well as thousands of Lithuanians. It is said that each of fourteen foreign languages is spoken by ten thousand people or more, and that the Chicago newspapers are printed in ten different languages, while the preachers give sermons in twenty different tongues.

We believe in having citizens who speak English, and we ask about the schools needed to make the children of this great foreign population patriotic Americans. We are told that a schoolhouse is to be found on almost every street, and that Chicago already has more than eight thousand teachers and more than one third of a million children in its public schools. It has also universities and professional schools, and the books in its libraries number more than two millions.

XLIV. A CITY OF ANIMALS — WE VISIT MILWAUKEE

CHICAGO has a city of animals in the midst of its great city of men. This city is the Union Stockyards, where about seventeen million sheep, cattle, and hogs are received every year. This is so many that if they could be driven along in single file, allowing each animal ten feet on the roadway, the procession would reach more than one and a half times around the world at the equator. These animals are coming into Chicago at every hour of the day and night throughout the year, and at the same time long trains are starting out carrying beef, pork, and mutton and their many by-products to all parts of the United States, and to our seaports for shipment abroad.

~~We take automobiles at our hotel, and ride to the~~ stockyards. The air is filled with the bellowing of steers, the bleating of sheep, and the shrill squealing of pigs. Here great droves of cattle are being unloaded and driven this way and that to be sold or be killed. There cars loaded with pigs are discharging their freight, and coming out of the trains farther on are long lines of sheep.

We climb to the roof of a tall building inside the yards and look down. We are in the midst of the animal city, divided into sections and wards, the houses of which are covered and uncovered pens, built along streets that cross one another at right angles. Each section has its own kind of four-footed inhabitants. Here is one devoted to cattle, the pens of which hold two or three hundred steers. The pens have no roofs, and we can look down on the backs of the cattle. Near by is a ward filled with sheep. It ~~has enough lambs to supply all the Marys of the schools of our town, and they all seem to be bleating.~~ On the opposite side of the road are hogs, large and small, each ward containing tens of thousands of grunters.

A small part of the Union Stock Yards, Chicago.

Look down into the pens. Each has a long trough for water, and another for food. There are thousands of such troughs, ~~and the feeding boxes if joined together would reach many miles.~~ The water comes from artesian wells twelve hundred feet deep, so that the supply filters in from below the bed of Lake Michigan.

Observe the factories about; they are the killing and meat-packing establishments. See how the railroad tracks extend out in every direction. The cars come in from every part of the corn belt, and go out to every town in our country. There is a canal at one side of the yards, upon which boats can bring animals in from Lake Michigan, and the place has every means of transportation for carrying in these animals as the raw material, and for sending out the meat and other products into which they are made.

What are those high buildings in the center of the city? They might be called the market house, for it is there that the stock men and packers come to buy and sell the four-footed citizens. The animals in the pens are changed every day. Those now below us will be dead by this time to-morrow, and another horde will have taken their places. As many as ninety thousand hogs, seventy thousand sheep, and nine thousand calves have passed through here in the space of twenty-four hours.

But let us go down into the city. It is early morning, and the streets are filled with hogs, cattle, and sheep moving from one street to another. Some of the drovers are on horseback and some on foot. They have great whips which they crack as they yell at the beasts. At the same time the agents of the packing houses are looking over the stock. They seem to buy at a glance, and when the selling hours are over, the animals are driven off to be slaughtered.

Let us go with them and see how this is done. The packing houses are more like huge factories than the small slaughterhouses of a village. We follow the hogs. They go in alive at one end and do not stop until they come out at the other in roasts and chops, and in hams, bacon, sausage, and lard. From the refuse are made buttons, hairbrushes, soap, and a hundred other things. Upon inquiry we find that every part of the body is used; and when the butchers tell us that they can sell in one shape or another every bit of the hog but his squeal, we wonder if a phonograph might not preserve that.

The same is true of the cattle and sheep, scarcely an atom of meat, bone, blood, or hair going to waste. The bones are made into fertilizer, and into bone black for the refining of sugar. They are turned into hairpins and combs, and are used as knife handles. The hoofs and the scraps of bone and skin become glue. The blood also is used as a fertilizer. The hides go to the tanners, and the very ones they are taking off now may come back to us next winter as soles for our boots and shoes. The wool is pulled from the sheepskins, and the skins afterwards used for the making of gloves. Some parts of each animal are turned into medicines, extracts, and tonics; and others into soups and the many meat products served in cans. Indeed, we might fill many pages with a list of the things made in these packing houses.

Much of the meat is sold fresh, being shipped over the country to the towns and villages in cold storage cars, and a great deal of it goes to the seaports, where it is placed in the cold chambers of the steamers for its long ride over the ocean.

Chicago is an excellent place to learn about the live stock of the United States, and our great meat-packing industry. It is to meat what Akron is to rubber, and Detroit to the automobile. Its stockyards are larger than those of any other city, although much meat packing is done at Omaha, St. Joseph, St. Louis, Kansas City, St. Paul, and Fort

Worth, and there are smaller yards in other parts of the country where animals are killed. The capital involved in the business of meat production in this country amounts to about eighteen billion dollars. The United States produces more meat than any other part of the world. The countries which compete with us in the markets of Europe are Canada and Argentina in beef, and Argentina, Australia, and New Zealand in mutton.

Leaving Chicago, we go by automobile northward along the western shores of Lake Michigan to Milwaukee, the largest city of Wisconsin. The distance is eighty-five miles, but the road is fine and our cheeks are fanned by the breezes fresh from the lake.

Milwaukee lies on Lake Michigan, near the mouth of the Milwaukee River. The harbor has been protected by a breakwater, and this river and two of its branches have been so dredged and widened that the shipping comes right to the doors of the factories and warehouses, as it does in Hamburg and Rotterdam. The port has a large trade, and it is noted for its meat packing, its tanneries, and manufactures of various kinds. It gets its ore and coal by the lakes and makes many things of iron and steel, including much of the machinery used in our flour mills. It grinds thousands of barrels of flour every day, and makes a cream-colored brick which is shipped all over the country.

During our stay we drive about through the residence section, which is on a bluff one hundred and fifty feet above the lake, and go out to Washington Park, where there is a large herd of deer. We motor along Sheridan Drive, which looks out on Lake Michigan, and later make a photograph of the City Hall, which has an illuminated clock dial, visible at night two miles away.

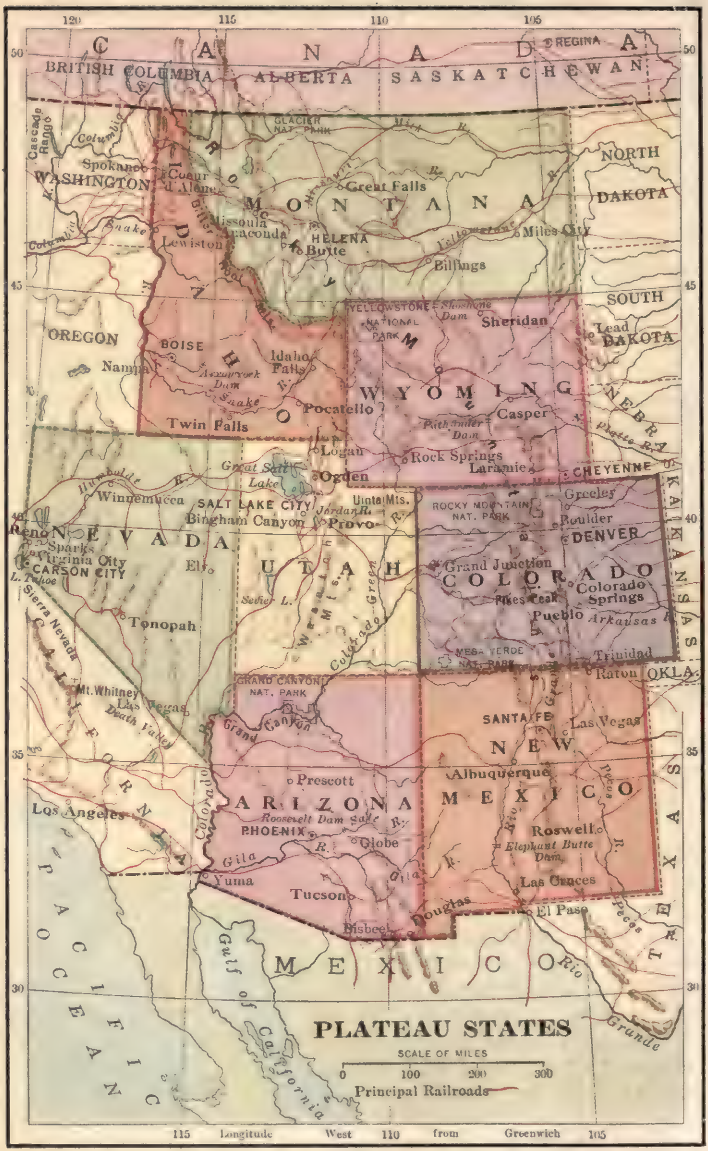
Grand Avenue, Milwaukee.

Milwaukee is sometimes called the German Athens of America on account of its many German citizens of learning and culture. Several of its daily newspapers are printed in German. The city has excellent schools and colleges.

1. Locate Chicago and show why it has become such a great city. Compare it in size and age with other very large cities.

2. What river connects Chicago with the Mississippi River? Show the advantages of the city as a railway and commercial center.

3. Trace a cargo of iron ore from Lake Superior to Chicago. A cargo of grain by water from Chicago to New York. A threshing machine to Siberia.



PLATEAU STATES

4. Why was the drainage canal built? How does it affect the supply of electric power at Niagara?

5. Where is the loop? Describe it. Why is so much business done there?

6. Why has Chicago so many foreigners? Is this a good thing for a city?

7. Make a visit to the stockyards and tell what you see. Why is Chicago the center of our meat-packing industry? Name some of the articles made in the meat-packing factories.

8. Tell the story of a hog from its piggyhood in the corn belt to the shop of your town. (See Carpenter's "How the World is Fed," page 92.)

9. What other countries export large quantities of meat? Which excels in beef? Which in mutton?

10. Where is Milwaukee? Mention some of the things for which the city is noted.

XLV. ON THE ROOF OF OUR CONTINENT — THE GREAT WESTERN HIGHLAND

OUR next travels are to be on the roof of the North American continent. We shall go west from Lake Michigan over the prairies to the Mississippi River, and there begin a gradual climb which will take us about a mile above the sea to the foothills of the Rocky Mountains. We shall cross over these mountains into the Great Western Highland, which is walled in by the Rockies on the east, and by the Sierra Nevada and Cascade Mountains on the west. The highland is an almost arid plateau high above the sea level, with ranges of mountains running through it from the north to the south. It extends through the United States from Canada to Mexico, and in places is as wide as from Chicago to Boston. Some of the mountains rise almost three miles above the sea. The plateau extends south almost to Panama, and north to Alaska, where it includes Mt. McKinley, the highest point in North America, having an altitude of about twenty thousand five hundred feet.

The Western Highland has deserts where one may travel for hours and see nothing but sagebrush and dusty-gray earth, with here and there perhaps the mounds of a prairie dog village. It has tracts of thin grass upon which are fed great flocks of sheep; a large part of our wool comes from this high, arid country. It has extensive forests in the regions where there is a more abundant rainfall, and in the desert are found many oases, made possible by the dams erected by our government to store up the mountain rains and snows for irrigation. It is the treasure land of the United States as far as minerals are concerned. Nearly everywhere through it are to be found gold, silver, and copper, and in places there are beds of coal, including some of good anthracite.

The plateau is divided into eight states of enormous size. Montana is surpassed only by Texas and California. Colorado is twice the size of New York. New Mexico is about four times the size of South Carolina, and Utah and Idaho are each twice as large as Kentucky or Virginia. Nevada is almost twice as large as Illinois, and Arizona is of about the same size. The state of Wyoming would make twelve the size of Massachusetts, and as for Rhode Island, it would be lost in some counties of our Western Highland.

The highland is sparsely settled on account of its desert character, but it has some cities, such as Denver in Colorado, Butte in Montana, Boise in Idaho, and Salt Lake City in Utah, which have grown up largely on account of mining. There are other cities in the irrigated valleys, and mining settlements scattered about through the regions of gold, silver, and copper production. But we shall see this in detail as we travel over the country.

The first part of our journey is through the corn belt. On our way west we pass through Wisconsin and Iowa, and stop at the fine commercial and manufacturing city of Omaha, on the Missouri River. Rich crops continue throughout eastern Nebraska, and farther on we see cattle and sheep feeding on the dry grass almost to the foot of the mountains. The latter part of our journey is through the Great Plains, which run north and south from Canada to Mexico. They begin west of the Missouri and gradually rise until they are about a mile above sea level at the foothills of the Rocky Mountains. The lands grow drier as we travel westward, but as we near Denver, we come out of the desert into a wide strip of green fields irrigated by the snow waters of the Rockies. The fields are cut by canals, and wheat, oats, and alfalfa are to be seen on both sides of the railway.

Beyond this strip of green we behold the Rocky Mountains. They rise up in the distance in a great wall of blue, crested with snow that shines like silver in the rays of the sun. Fleecy white clouds rise from some of the peaks, and we can hardly tell where the cloud wall ends and the snow wall begins.

We spend a few days in Denver. It is a beautiful city, a mile above the sea and right on the edge of the Rockies. It has grown on account of the mining industry of the western plateau which is tributary to it, and the grazing and agricultural regions near by. It is the leading industrial center of the Western Highland, one of its chief products being mining and smelting machinery. It is noted, also, for its beautiful residential sections and its fine, dry climate.

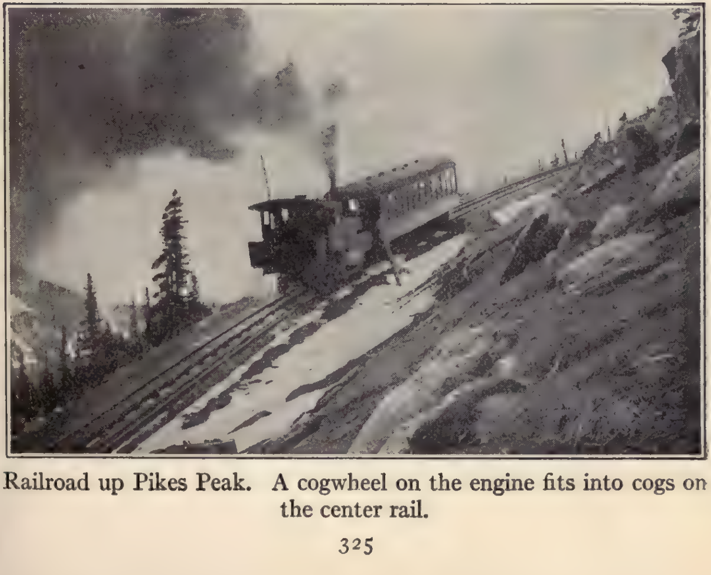
Denver is one of the chief gateways to the mountains, and to most of our national playgrounds, the great public parks and forest reservations which the government has set aside upon the plateau. There are mountain parks almost on the edge of Denver, and Pikes Peak, which rises almost two miles above it, is only a few miles distant by rail.

Pikes Peak is named after Zebulon Pike, who discovered the mountain more than a century ago and tried to climb it. He failed, and as he turned back he remarked that nothing but a bird could reach that snowy summit.

But we shall reach the top of Pikes Peak, traveling at our ease in a car. A railroad like the one upon which we went to the top of Mt. Washington takes us up its steep slopes, until at last when we step from the train we are almost three miles above the level of Washington, D. C., where we started upon our long tour. There is snow on the top of the mountain, and we make snowballs and have a snow fight while we stay.

Standing upon Pikes Peak, we have a wonderful panorama of mountains and valleys. Stretching to the eastward are the Great Plains, dotted with villages and cities, which are mere specks on the landscape. At our feet is the Garden of the Gods, a valley filled with huge rock formations, so far down that it looks like a flower bed. To the north and south and off to the west rise hill upon hill and mountain upon mountain, looking like piles of rocks of gigantic size, thrown together in all sorts of shapes. As we stand on the peak the clouds are floating above and below us. Now they sweep upward, and for a time we are enveloped in mist. Now a thunderstorm breaks down the slope. The lightning flashes against the rocks, and we hear the deep roll of thunder in the rain storm far below us.

Pikes Peak, as seen from near Colorado Springs.



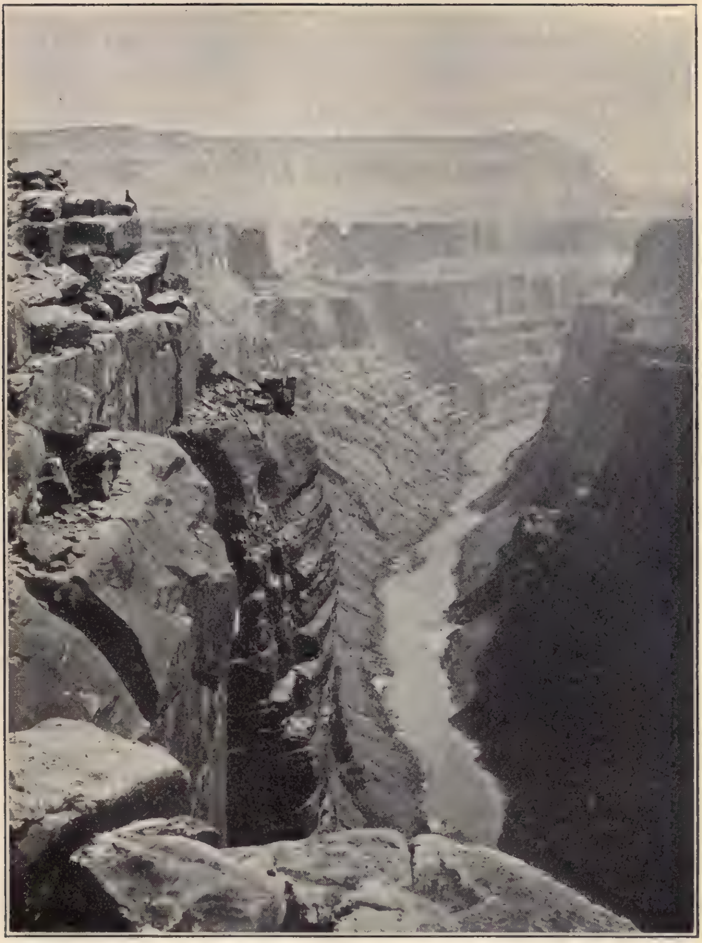
Railroad up Pikes Peak. A cogwheel on the engine fits into cogs on the center rail.

XLVI. OUR NATION'S WONDERLAND — THE NATIONAL PARKS

THE western plateau is the wonderland of America. There is no other place in the world where we can see so many marvelous things. It has waterfalls higher than Niagara, deserts almost as dry and dreary as the Sahara, forests which have been turned into stone and other forests whose trees are so big that a large schoolroom could be cut out inside the trunk of one of them and leave room to spare.

Within two or three days' ride of Pikes Peak lie some of our greatest natural wonders. Going to the northwest we can reach the hot springs and geysers of Yellowstone Park, and going still farther in the same direction we can reach Glacier Park, where more than sixty ice rivers are moving slowly down the mountains. We can go to the southwest to the Mesa Verde Park, where were the homes of the cliffdwellers, and can actually go through some of the homes of those ancient Indians. They lived in caves and in houses which they built in the cliffs, reaching them by ladders or zigzag trails from their farms in the valleys below.

Farther on to the southwest is the Grand Canyon of the Colorado, where the river flows between the walls of the deepest and longest cut in the earth crust known to man. The canyon, cut out by the river, is a mile deep, fifteen miles wide at the top, and two hundred miles long. The space is half filled with rock masses carved into forms which resemble gigantic castles, temples, and cathedrals. If they stood on the plateau they would form a rugged range of mountains a mile high. Their walls are highly colored in tints of red, chocolate, yellow, and gray. These



Grand Canyon of the Colorado River in Arizona. The walls of the canyon are brightly colored. Notice how small the man at the upper left appears.

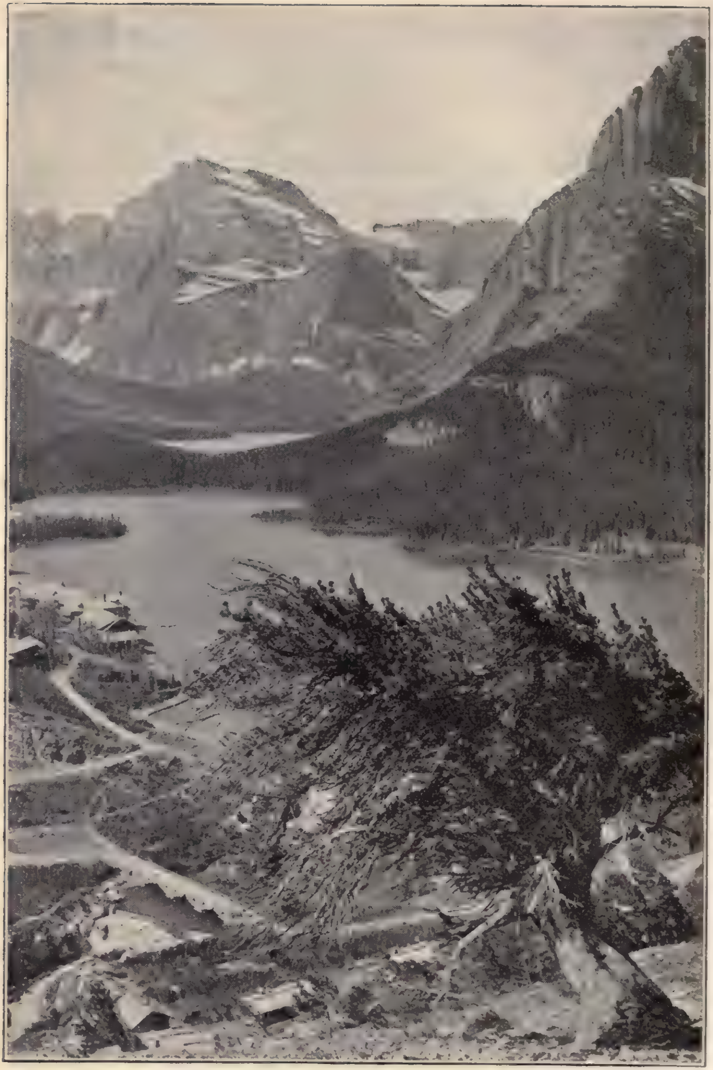
colors change from morning to evening, and sometimes the canyon is hidden by clouds floating in its depths. The Colorado River rises in Colorado, and drains a large part of the Rockies.

Traveling to the north and south through the Western Highland we shall find many other natural wonders. In Utah there are huge bridges of stone, formed by nature, which far surpass the natural bridge of Virginia. In California are lakes such as Ta′hoe, at an altitude higher than that of Mt. Washington, and in Oregon, in the heart of the Cascades, is Crater Lake, whose bed is the top of an extinct volcano as high as Mt. Shasta, which is in plain sight a hundred miles off to the south. Crater Lake is surrounded by gray lava and its water is the bluest of blue.

Edwin Natural Bridge in Utah, 104 feet high and 194 feet long.

It is two thousand feet deep, and as far as one can see it has no inlet or outlet, although some of the water is supposed to escape underground and to reappear in the Klamath River, a few miles away. The Mount Rainier (rā-nēr′) National Park near Seattle (sē-ăt″l) has twenty-eight glaciers, some of which are five hundred feet thick, and the Rocky Mountain Park in Colorado has snow-clad peaks, one of which is more than fourteen thousand feet high.

Altogether Uncle Sam has set aside nineteen great parks, which are to be kept on account of their scenery and grandeur as the playgrounds of the nation. Some of them contain buffalo, moose, elk, bear, and other wild animals, which no one is allowed to shoot or disturb. Others have mountain sheep and goats. In all of them one can go camping without charge, and in most of them are good roads and trails and comfortable hotels. In the Sequoia (sė-kwoi′a) Park of central California, there are twelve thousand trees over ten feet in diameter, and in the same region is the Yosemite (yô-sĕm′ĭ-tē) Valley, with three groves of big trees and waterfalls of extraordinary height. General Grant Park near by has a tree thirty-five feet in thickness, which has been named General Grant. In Wind Cave Park, South Dakota, there are miles of galleries and chambers containing peculiar formations, and in Platt Park, in southern Oklahoma, are sulphur and other springs of medicinal value. We have a park off the coast of Maine, on Mt. Desert Island, named in honor of General Lafayette, and in south central Alaska is Mt. McKinley Park, named after President McKinley. In northern California the Lassen Volcano National Park has the only active volcano in the United States proper; and in the Hawaiian Islands are the two great active volcanoes of



Camps and lakes in Glacier Park.

Kilauea (kē-lou-ā′ä) and Mauna Loa (mou′nä lō′ä) which have been set aside for the use of the public. Glacier Park in Montana has two hundred and fifty lakes fed by glaciers, and precipices hundreds of feet high. All of our national parks are under the supervision of the Secretary of the Interior, and in charge of a director especially appointed.

We wish we could visit all of these wonders, but we have only time enough to see a bit of one of them. We cross from Colorado into Wyoming, and travel to its northwestern corner and enter the Yellowstone Park.

XLVII. A VISIT TO THE YELLOWSTONE NATIONAL PARK

YOU must not think the Yellowstone a small place because it is called a park. It is almost as large as Connecticut, and larger than some of the smaller kingdoms of Europe. The surface is a rolling plateau, parts of which are covered with woods, while in other places there are mountains and deep yawning canyons. The lowest point in the park is more than a mile above the sea, and near it are mountains more than two miles in height.

The Yellowstone has five hundred hot springs that are always boiling, and many of them spout water high into the air. As the water cools it leaves a sediment, which builds up structures of all the colors of the rainbow. One hot spring has thus formed a white hill about it more than two hundred feet high. The water flows out of the top of the hill and falls into one semicircular basin after another built up by the sediment. Some of the basins are only a few inches deep, while others have a depth of six or eight feet. The mineral matter has painted the sides of the basins in all shades of blue, yellow, scarlet, and green. It has frescoed some portions with lace work and embroidered them with what seem to be beads. At the top the water is boiling hot. It cools as it falls from basin to basin, so that starting in at the bottom one could have baths of all temperatures by merely walking to the top.

What would you think of a spring flowing with mineral paint? There is one in Yellowstone Park that covers more than an acre. The paint is of many colors, and it bubbles like hot mush on the fire. Another fountain is always vomiting forth green, slimy mud mixed with sulphur, the smell of which is so sickening that we put our handkerchiefs to our noses as we go by.

The spouting springs are called geysers. Some of them spout every year or so, and others every few minutes. The Grand Geyser throws up a volume of steam and boiling water to a height of three hundred feet, and "Old Faithful" sends up every hour an immense volume of steam and boiling water as high as a church steeple. It keeps spouting for several minutes at a time, the water falling back in clouds of spray.

Another wonder is the Yellowstone Canyon. The waters of the river here have a fall of three hundred feet, or almost twice the height of Niagara Falls. They then flow through a gorge whose walls are a third of a mile high, and the rocks composing them are of such colors that they look like precious stones. There are rocks as white as crystal, others that shine like amethysts, and still others that glitter like diamonds as the sun strikes them. Halfway down the walls of the canyon are ledges where eagles

Giant Geyser in eruption, Yellowstone Park. It throws a column of water and steam several hundred feet into the air.

have built their nests, and if we look carefully we may perhaps see the young eagles in them.

There are other features of Yellowstone Park which we fear to mention lest our friends at home may think of us as some men did of a preacher who described his visit to the park. His congregation listened quietly until he told them how he had stood upon a rock beside Yellowstone Lake and caught a fish, and then, without moving from his place, had given his fishing rod a twist and thrown the fish still hanging to the hook into a boiling spring behind him and cooked it. As he told this, one of the deacons arose and asked the pastor to stop then and there, saying, "We have listened to-night to bigger stories than we have ever heard before in our lives, but that last one is too much— too much!"

The story, however, might have been true. The waters of Yellowstone Lake are cold and filled with fine fish. Upon its eastern shore near the edge of the lake is a boiling spring, called the Fish Pot, and one might stand there and catch a fish and easily cook it as the parson described.

1. Locate the Western Highland. What mountains bound it on the east and west? How far does it extend north and south? What and where is its highest mountain? Compare this mountain with some other great mountains of the world. (See page 495.)

2. What are the Great Plains? Why are the lands green along the foothills of the Rockies?

3. Where are the Rocky Mountains? The Sierra Nevada? Pikes Peak? Compare Pikes Peak with the other high mountains of the United States.

4. How many great national parks have we? Name some of them and tell for what each is noted. Take a trip through the Colorado Canyon and tell what you see. How was the Canyon formed?

5. Who were the cliff dwellers and how did they live?

6. Where is Yosemite Park? Yellowstone Park? Make a visit to the Yellowstone and describe its chief features.

7. What is a geyser? A volcano? Have we active volcanoes in our dominions? Where? Describe Kilauea. (See Carpenter's "Australia and Islands of the Sea.")

8. Name some kinds of game found in the parks.

XLVIII. A TRIP THROUGH A GOLD MINE

FROM Alaska southward to the Isthmus of Panama, the mountains of the Great Western Highland have many veins and beds of gold, silver, and copper. In the Sierra Nevada range are immense bodies of white quartz with little veins of gold running through them. There is gold in the sand of many of the rivers, and it is found in the gravel beds high above the streams, where the water flowed ages ago. Such gold is called placer gold. It usually lies near the bed rock, the heavy metal having sunk to the bottom of the sand and gravel as the water flowed through. Gold mixed with the rock in veins is known as quartz gold. It occurs in a free state, but generally so finely divided that the rock has to be ground to powder and chemically treated to get the gold out.

The first gold of the United States came from the Appalachian Mountains. A little gold has been found in Virginia, North Carolina, South Carolina, Georgia, and Alabama, but our richest gold fields are upon this Western Highland. We have many gold fields in Alaska, which we shall see when we visit that territory, and there are others in the Rockies, and in the Sierra Nevada and Cascade ranges of our western states.

Up to 1920 the United States had produced four billion dollars worth of gold, and most of this was from these western states. It was in 1846 that James Marshall, while digging a race for a sawmill along the banks of the American River in California, found some bits of yellow metal which turned out to be gold. The news spread, and soon thousands of miners were washing the dirt along the banks of that and other California rivers. In less than a year they had dug up more than five million dollars' worth of gold, and within four years more than two hundred million dollars' worth had been washed out of the streams of the Sierra Nevada. The news went out and men from all parts of the world rushed to California.

Then gold was found in the mountains to the eastward, and mining camps sprang up everywhere. At first the miners washed out the gold-bearing earth in pans. Then they used cradles, or troughs which could be rocked back and forth, and later they conducted the streams down the mountains to the mines and by hose threw the water against the sides of the hills to wash down the gold-bearing gravels. Huge dredges were invented for mining the placers by the aid of steam engines. They also built flumes, or troughs, into which they turned the streams, and threw in the gravel. Sticks were nailed across the beds of the troughs, and quicksilver placed there. The water washed away the mud, and the grains and dust of gold fell to the bottom. Quicksilver dissolves gold as water does sugar or salt. By and by all the gold went into the quicksilver, which was heated and evaporated, leaving the gold behind.

A little later the miners began to hunt for the beds of rock like those from which nature had washed this gravel and placer gold, and to crush the rock to get out the metal. Such mining is called quartz mining. It is from quartz mining that most of our gold now comes.

But suppose we visit a quartz mine, and see how the precious ore is taken out of the rock. We select one not far from Pikes Peak. It is high up in the mountains, and as we ride up to it on our donkeys, we wonder how men could tell that there was any gold there. On the way we see hundreds of holes dug by prospectors who failed to find gold, and are told that men often search in vain for years to make new gold discoveries. The prospector often travels on foot with his shovel and pick, his gun, and his cooking utensils, provisions, and blankets loaded upon a horse, or perhaps upon a burro not larger than a Shetland pony. He sleeps in the open air and shoots game to help out his food supply. As he travels he looks carefully at the rocks, and now and then washes the gravel of the streams to see if he can find "color"—gold dust or grains.

Gold mine near Cripple Creek, Colorado. The mining here is all done underground; the ore is brought to the surface and sent to a mill.

If he does he follows the signs until he reaches the mother lode or rock from which it was washed away.

At last we come to our mine. The large wooden building above it contains the steam engine and hoisting machinery to lift out the cars of ore. This building is known as the shaft house. It is right over the entrance to the mine, and the hole which goes down into the mine is the shaft. This shaft is about eight feet square, and as deep as the Washington Monument is high. Elevators are always moving up and down it bringing out the rock, and we can step on one and go down. The shaft is sunk beside the vein of gold-bearing rock, and from it tunnels are run off into the vein to get at the ore. Each tunnel has a little railroad with steel cars, each of which will hold one or two tons of rock. When a car is filled and brought to the elevator, a signal to the engineer sends it to the top.

A car has just been taken off as we reach the shaft house, and we start down into the mine. Within a few seconds we are far below the surface. The darkness of the shaft is so dense we can feel it, and we huddle together in fear. We drop sixty feet before we reach the first level. Here we see a score of dirty miners, each with a candle on his cap. The light makes them ghostlike against the darkness of the tunnel behind. They have a carload of ore which they are waiting to send to the top.

We now drop to a second level, sixty-five feet farther down, and then to another and another, and at last, at the fifth tunnel, three hundred and eighty-five feet below the surface, we get out and start into the mine. The men lend us their candles, and as we walk along the manager points out the vein containing the gold. It looks like slate, and seems to be a sandwich of slate between walls of other rock running slantwise into the earth. How deep it goes no one can tell.

As we go on through the tunnel we see the miners at work. Here one is drilling a hole for a blast. He uses compressed air, and his steel drill goes chug, chug, chug, as it crushes a hole into the rock. Now he lays aside his tools, and takes up what looks like a big tallow candle, and sticks it into the hole. Notice how delicately he handles that candle. It is well he does, for it is dynamite, and should it go off it would blow us to pieces. Sometimes gunpowder is used. Now the man is connecting a fuse with the dynamite. He inserts the fuse and packs the earth tightly about it. The manager tells him to light the fuse to show us how the blasting is done. At the same time he advises us to run. We do so, and are in a side tunnel when the terrible explosion occurs. The very earth shakes and the air blows out our candles, although we are hundreds of feet away from the blast. We hear the rock fall, and returning find the miners digging it out with picks and throwing it into a hole in the bottom of the tunnel, down which the ore rolls into the cars in the tunnel below.

We look at the rock but can see no signs of gold. It seems just like the stone we see on the roadway or in an ordinary quarry. Still, each ton of it contains from ten to several hundred dollars' worth of pure gold. Some of the ore is so valuable that a half bushel sack of it would be worth ten thousand dollars.

Different kinds of ore need different treatments to extract the gold. The free gold can be crushed and washed out or it can be saved with quicksilver. Some ores are treated by chemicals in various ways, and much of the low-grade ore, which contains only small quantities of gold, is sent to cyanide mills. There the ore is soaked in a solution of water and cyanide of potassium, a chemical that looks much like alum.

We jump on the cars and ride to the shaft, from which we follow a carload of rock to one of these mills. The rock averages only one half ounce of gold to the ton, and this half ounce is distributed almost evenly throughout the carload. The ore of this carload is low grade and only one atom in many, many thousand atoms of rock is pure gold. The question is how to get the gold out.

We see the ore thrown into the crushers, whose huge rollers grind it to pieces. It grows finer and finer, until it is all dust and bits of rock no bigger than a pea. It is now ready for the drier, in which gas flames are blown through the ore to take out the moisture. The ore is then again crushed and ground until it becomes a dust almost as fine as the flour used for baking. We pick up the flour dust and rub it to and fro in our hands. It does not scratch the skin, and we look in vain for some gleam of gold. There is none. Were it the dust on a roadway we should walk over it without thinking, yet every grain contains a minute portion of gold.

The ore is now ready for the cyanide bath. We see the dust put into a circular steel tank as high as one's waist, and wider than an ordinary schoolroom. When the tank is more than half full, the cyanide water pours in. It comes out of pipes, and looks like drinking water when it flows from the spigot. We are told not to taste it, however, for it is a deadly poison. As the cyanide water flows through the dust it becomes a great pot of brown mush, seasoned with gold. The cyanide dissolves the gold in the rock and it passes into the fluid, which is then drawn off through a hole in the bottom of the tank.

Another chemical process is now necessary to get the gold out of the cyanide bath. The fluid passes through boxes filled with zinc shavings; here it takes up part of the zinc and drops the gold. The remaining mixture of zinc and gold is then heated in a furnace in such a way that the zinc passes off and the gold only is left. The result is a brick of bright gold purer than that of a gold wedding ring. It is now bullion and ready for use in the arts or for coinage at the mint.

XLIX. A DAY IN A SILVER MINE

YESTERDAY we spent the day far down in the depths of the earth, surrounded by gold. To-day we shall again go below the surface, this time to see silver mined. About three fourths of all the silver of the world comes from North America, and one third of all from the United States. We are now mining silver in twenty-one states, most of which are on this Western Highland. The best producers are Montana, Nevada, Utah, Idaho, Colorado, Arizona, and California.

Silver is never mined in placers. It is usually found in combination with other minerals, and much of our product comes from mines which produce also copper or lead. The Comstock Lode of Nevada has yielded silver and gold worth several hundred million dollars. In the Coeur d'Alene (kûr-dȧ-lān′) mines of Idaho the silver is mixed with lead, and about the city of Butte (būt) in Montana it lies in ores loaded with copper.

The mine we shall visit to-day is situated in the mountains of Utah. Its ore contains both silver and gold, and it has already produced about forty million dollars' worth of silver. Connected with the mine are enormous mills for getting the metals out of the rock.

We enter the mine by a shaft like that in the gold mine we visited, and we walk through tunnel after tunnel, with great stopes or rooms on each side. The mine has been worked many years, and at twenty different levels. At the lowest tunnel where we go through, we are hundreds of feet below ground. Indeed, a good idea of the mine might be had from a big apartment house building, each mine level being considered a floor. The shaft is the elevator of the apartment house, and the tunnels which run off into the vein are the halls. The stopes from which the ore has been taken are the rooms and the elevator raises and lowers the miners and rock from story to story. This great mine apartment is lighted by electricity, and its machinery is moved by electricity generated by the falls of a river near by.

The methods of blasting down the silver rock and extracting the ore are about the same as those in the gold mine, but there is an important difference in the two mines, which has nothing to do with the ore. Our gold mine was dry and this mine is wet. All kinds of metals are found in wet and dry mines, but the working of a wet mine is much more difficult.

In the region where we are now there are underground waters which force themselves into the workings, so that huge pumps are installed, and steam and electricity are kept busy day and night in carrying the water away. As we go through the tunnels the water drips from the roof, and as we look down we see that the floor of the tunnel has a torrent beneath it. The water is rushing along under the boards at the rate of ten thousand gallons a minute, and the walls and roof of the tunnel are braced by timbers

Drilling in a silver mine. The men are making holes in the rock in which to put dynamite blasts. The drill is run by compressed air.

to hold back the wet earth. The timbering of a mine is expensive. The best of wood is required, and that used here comes from the forests of Oregon, hundreds of miles away.

As we go on through the mine we stop at a place where the blasts have just thrown out huge masses of silver-bearing ore and ask the miners to show us the vein. It has an average width of fifteen feet, and in some places it is forty feet wide. Running through it are the dark streaks of rock containing the silver. Some of these streaks are so wide that we can hardly reach across them. The silver is so mixed with the rock that it does not shine out. To our eyes the ore seems nothing but stone. The only sign of any metal whatever is a bright glint of gold here and there.

We watch the miners loading the ore on the cars, and then follow it to the surface. We see the cars carried from the shaft to the top of a building and the rock dropped into a crusher, where it is broken into bits no larger than pebbles. The ore is now ready for the drier, which is much like that in which we saw the gold rock roasted for the cyanide mills. The pebbles are next pounded to flour with heavy steel stamps, and the flour is mixed with salt and roasted again to prepare it for a bath of quicksilver, which, as we shall see later on, will take out the silver.

As we leave the drying room we see several piles of what seems to be fine sand lying on the floor near the furnace, and are tempted to jump into them. The manager pulls us back quickly and tells one of the workmen to stir up a pile with a shovel. He does so, and we see that only the outside is yellow. Under the thin yellow coating the roasted rock is red hot. Had we jumped in, our legs would have been burned to a crisp.

The process by which the quicksilver takes the silver out of the dust reminds one of the prince, who, as the fairy tale goes, broke through the hedge and kissed into life the beautiful princess who had been sleeping there one hundred years. It is the quicksilver prince whose kisses take the sleeping silver ore maiden out of her palace of rock, in which she has been locked up for ages. The ore dust containing the silver having cooled, it is thrown into great vats of steel and enough water is turned in to make the whole a mass of brown mush. A few pounds of quicksilver is then poured into this mass through a pipe, and the stirring machinery set at work to mix the quicksilver into the ore. As the mass is stirred the quicksilver divides into drops about as big as the point of a pin, and these thousands of little drops move through the sand seeking out the particles of silver. The silver unites with them and after a time all of it has been taken out of the ore.

The stirring is now stopped, and the heavy quicksilver runs down through the ore and out through a pipe into a bucket. It is now put into a very hot furnace, where the quicksilver is driven out of the mixture in the form of a vapor which flows off into a pipe, leaving the silver alone in the furnace. The quicksilver vapor is condensed by passing cool water over the pipe, and, thus turned into a liquid once more, it can be used over again.

The silver which now lies in the bottom of the furnace looks like a piece of old plank covered with ashes. It is impure silver bullion, and is ready to be shipped to refineries in other parts of the country. There, by means of chemicals and heat, it is further purified and fitted for manufactures of various kinds, or it may go to the mint and become silver dimes, quarters, half dollars, or dollars.

There are other methods of getting the silver out of the ore, and in some cyanide is used as we saw it in the mining of gold. In one process the silver ore is put into a bath of molten lead in a furnace. In another the silver is taken out by means of zinc and lead, the whole being melted and refined in such a way that the pure silver is saved. A different process is sometimes used when the ore has silver in combination with copper, and in some cases electricity is employed to separate the gold, silver, and copper.

L. A MOUNTAIN OF COPPER

IS it not wonderful that this dry, thirsty region should have such great treasures locked up in its rocks? At first glance most of the country seems absolutely worthless, but here and there are places so rich in minerals that the land is almost as valuable as that in lower Broadway, New York. This is the fact near Butte, Montana, near Bisbee, Arizona, and in Bingham Canyon, in the high mountains not far from Salt Lake in Utah. These places have some of the richest copper mines of the world.

We shall first visit Butte, which is almost as far above the sea-level as the top of Mt. Washington. On the slopes of the mountains about it are great copper smelting furnaces that day and night for years poured out fumes mixed with sulphur, which destroyed the vegetation. The grass could not grow, the flowers did not blossom, and the green leaves dropped from the trees. The country is dreary to-day, but it looks much better since the sulphur in the fumes has been saved by new processes of ore reduction.

In the midst of these surroundings we find a large city supported by the metals that are being taken out of the rocks. The chief of these is copper, the ore of which has to go through these furnaces in order that the metals may be saved.

We are surprised at the size of the reduction works.

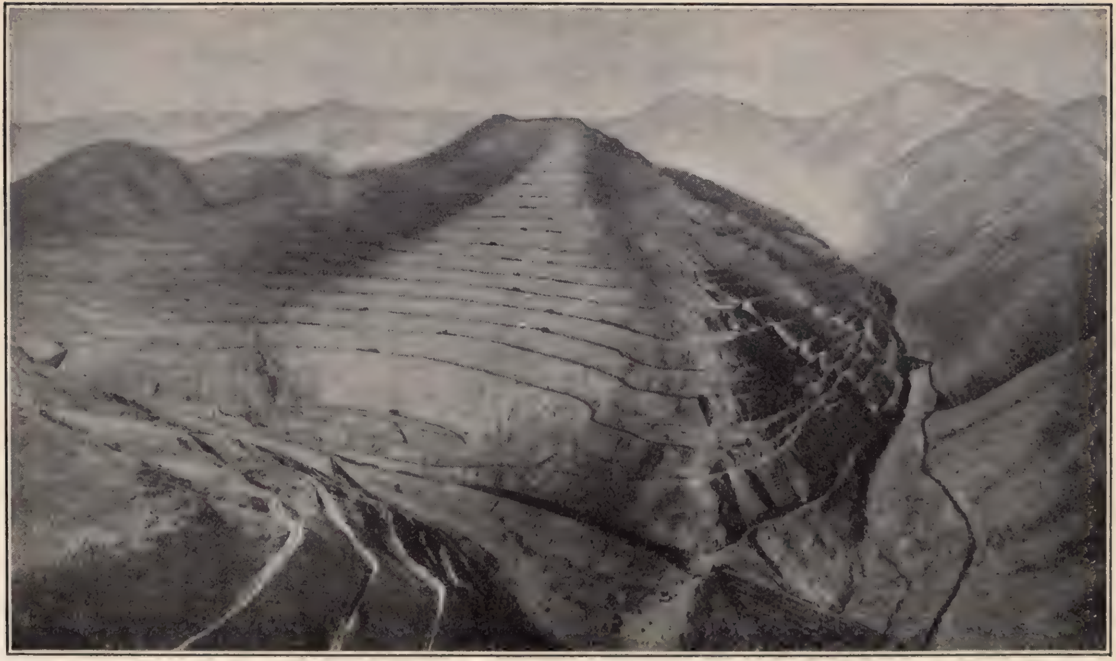
Some of the chimneys are one third as high as the Washington Monument, and connected with them are flues so large that a wagonload of hay could be driven through one without touching its walls. The flues supply the drafts for the furnaces. Inside the works are huge boilers, and engines with flywheels as high as a three-story house. The power produced is conducted by cables from place to place along the side of the mountain.

Entering the works, we are deafened by the noise of the stamps as they fall upon the ore and crush it to powder. This becomes a mush which is run over tables and washed and rewashed. It passes through grinding machines, and then goes to the smelter. Here it is roasted, filling the air so full of sulphur that as we come near we feel as though hundreds of matches were being burned under our noses. The metal is extracted from the roasted ore by a process similar to that by which iron is smelted in a blast furnace.

The metal is still impure and is refined by chemical and electrical processes, the gold, silver, and other metals being separated. The final product is pure copper such as is used for making the wire which carries the current through our telephone and telegraph lines.

Indeed, the uses of this red metal are so many and so important that it is of more value to man than either silver or gold. Some copper is used in every steamer and railroad car, and in every automobile and airplane. It forms the best medium for the electric current, and millions of pounds of it are drawn out into telegraph and telephone wires, and the cables for electric lighting and power transmission. The core of the cables that run under the oceans from our continent to other parts of the world is of copper.

We use millions of pounds of copper a year in making the pins that fasten our clothes, and we have a factory in



A mountain of copper ore at Bingham, Utah. There are railways and steam shovels on the terraces.

Connecticut that consumes a thousand pounds in one hour for the eyelets of shoes. Slightly alloyed it is used for making copper cents, and mixed with zinc it forms brass. Copper is employed largely in scientific instruments and in making munitions. During the World War the Germans could get but little copper and they had to melt up their copper kitchen utensils, the brass doorknobs of their houses, and even the bells of their churches to supply the needs of the war.

Of this valuable metal more than half of all that is mined in the world comes from the United States, and most of this is from the Great Western Highland. Here at Butte the copper veins run below the surface to the depth of three fifths of a mile, and at Bingham in Utah there is enough ore in sight to supply seven million tons a year for almost half a century. The Bingham mines are in what seems to be a mountain of copper ore. They run in terraces around the mountains, and the ore is such that it can be taken out with steam shovels. We have other great copper deposits in Arizona, Nevada, New Mexico, in Michigan along Lake Superior, and in some of our southern states.

We have immense beds of copper in Alaska, including those of the Kennecott Mines, which lie high above several great glaciers. The Kennecott copper was discovered by two mining prospectors, who saw a patch of green high up in the mountains. At first they thought that it was grass, and that there might be mountain sheep feeding upon it. They climbed up to hunt, and lo! it was copper which had been turned green by the weather.

1. In what two regions of the United States is gold found? Where are our richest gold fields? Tell the story of the discovery of gold in California.

2. Give some of the uses of gold. What is gold bullion? How is it made into coins? (See page 69.)

3. What is placer mining? Make a visit to a placer mine and tell what you see. How is quicksilver used in such mining?

4. What is quartz mining? Describe a quartz mine. Follow the ore to the smelter and show how the gold is taken out by cyanide.

5. From what part of the world does most of the gold come? Compare our product with that of Africa? With Australasia. (See page 499.)

6. From what region does most of our silver come? How does our production of silver compare with that of the rest of the world? Name the chief silver-producing countries. (See page 499.)

7. With what other minerals is silver often combined?

8. Visit a silver mine and tell how the ore is taken out of the rock. Describe the process of saving the metal by quicksilver.

9. Name some of the uses of silver. Describe the adventures of a silver spoon from the mine to your breakfast table. Let the spoon tell its story.

10. Name some of the uses of copper. What part did it play in the World War? What coins are made of it? Why is it used for telephone and telegraph wires?

11. From what regions does most of our copper come? Most of the copper of the world? (See page 500).

12. What is brass? (For further information about copper and brass, see Carpenter's "How the World is Housed," pages 182-188.)

13. Which is of most value to man; copper, silver, or gold? Why?

LI. ACROSS THE WESTERN PLATEAU

THERE are several trunk lines of railway that cross the United States from the Mississippi valley to the Pacific Ocean. From Chicago we might have gone to St. Paul and traveled westward over the Great Northern or the Northern Pacific to Seattle on Puget Sound. Or we could have gone to New Orleans, and taken the Southern

Pacific, crossing Texas, touching the Mexican boundary at El Paso, and going on through the desert regions of New Mexico and Arizona to southern California. Or we could have gone by the Atchison, Topeka, and Santa Fe from Kansas City through Kansas, Colorado, New Mexico, and Arizona, following a route farther north than the Southern Pacific.

Among the other important railways over the Western Highland are the Chicago, Milwaukee, and St. Paul, the cars of which are operated largely by electricity, the Union Pacific, and the Denver and Rio Grande and Western Pacific. Our trip from Omaha to Denver was on the Union Pacific. This road, with the Central Pacific, was the first to connect the Atlantic and Pacific oceans, and when it was completed in 1869 it was considered the greatest feat ever attempted in railway construction. Before that the only means of crossing the Western Highland was on horseback or in wagons drawn by horses or mules. The journey took months, and men and horses often died of hunger and thirst before they reached their destinations.

Returning from Butte to Denver, we shall continue our travels on to Salt Lake City over the Denver and Rio Grande railway, which passes through some of the most wonderful scenery in the United States. We travel southward along the foothills of the Rockies until we reach Pueblo (pwĕb′lō), where we turn to the west. Our train plunges through the Royal Gorge, where the walls of rock rise above us for more than two thousand feet, and then ascends rapidly in the climb over the Rocky Mountains. Now the railroad winds about in great loops and curves; now it passes through canyons where the cliffs seem about to fall down upon us, and, climbing always upward, it soon

Our train passes through Eagle Canyon in Colorado.

reaches Marshall Pass, almost eleven thousand feet above sea level.

Here everything is dry, rocky, and thirsty, and the air is so clear that we can see for miles. It is hard to breathe, and some of us feel faint from the rarity of the atmosphere. We ride for hours without being out of sight of snow-clad peaks, and are told that in winter the snow falls in such quantities that the drifts cover the railroad and snowplows have to be pushed along by locomotives to clear the tracks. For this reason miles of snowsheds have been built over the road along the sides of the mountains to keep the snow from stopping the cars. As we go through these sheds we seem to be passing through a long tunnel, except that we now and then can peep out through the cracks and see thousands of feet down into the valleys below.

The mountainous parts of the route are thinly populated. Many of the stations are little more than section houses, and some consist only of a post on which is painted the name. From such stations trails lead off into the mining districts, and we sometimes see long lines of burros, loaded with powder, food, and other supplies, on their way to the gold and silver camps far back in the mountains.

As we travel westward into Utah we see herds of cattle and flocks of sheep grazing on the plateau. Utah has over two million sheep, and some other states have more than Utah; namely, Wyoming, Idaho, Montana, California, New Mexico, and Texas. The herders live in covered wagons from one year's end to another. They are aided by their dogs in driving the sheep from place to place to search out the best feeding grounds. As we see the wagons standing out on the plains with nothing but the bare rocks, dusty grass, and blue sky about them, it seems to us that a herder's life must be lonesome, and we are not surprised that one sometimes goes crazy from thus living all alone in these dreary surroundings.

At times we pass prairie-dog villages, little hills or mounds each of which has a hole leading down into the nest where these tiny animals live with their young. Prairie dogs are not real dogs, but small rodents about the size of rabbits. We see some of them sitting on their hind legs on the tops of their mounds and watching the cars as we go by. Others are frightened and scamper into their holes. Such prairie-dog colonies are scattered over the Western Highland

Sheep grazing on our Western Highland. This is the chief sheep-raising region of the United States.

from Canada to Mexico. They vary in size from a few acres to thousands of square miles, and are inhabited by thousands of animals. In Texas there is one colony longer than from New York to Boston and wider than from Philadelphia to Baltimore. It covers an area half as large as the state of New York, and is said to have more prairie dogs than there are people in the whole United States. This statement is based upon figures given by Dr. C. Hart Merriam of our Department of Agriculture. Dr. Merriam says that thirty-two prairie dogs eat as much grass as one sheep, and that the grass eaten by the great Texas colony would support more than one million cattle. For this reason the farmers are advised to destroy these little animals.

We look in vain for grizzly bear, deer, and mountain sheep as we ride through the wilder parts of the plateau. Such animals are seldom seen near the track, although a short horseback ride from almost any of the stations would bring us to places where they could be found.

The country grows more dreary as we travel on westward, when all at once we come out of the desert into the valley of the Great Salt Lake, made green by irrigation, and soon reach Salt Lake City, the capital of Utah.

LII. SALT LAKE CITY

THERE are few towns more beautifully situated than Salt Lake City. It lies between the shore of the Great Salt Lake and the precipitous wall of the Wasatch Mountains, the peaks of which are crowned with perpetual snow. Northward and southward as far as one

Beet sugar factory. The sugar beets are handled by machinery. Their sweet juice is soaked out, and boiled to produce sugar. When refined, beet sugar is like cane sugar.

can see is a valley covered with grain and sugar-beet fields, meadows, orchards, vineyards, and gardens. The city itself has wide streets shaded by great forest trees. Its houses have beautiful lawns, and along the sides of some streets flow streams of mountain water.

Salt Lake City is the most important railway and commercial center of our Western Highland. It is in the heart of the Great Basin, and is the distributing point for a rich mining, stock-raising, and farming country. Near by are some large mines, smelters, and metal refineries. The power for its factories and for the electric light and street railway plants is developed from the waterfalls in the mountains not far away.

Much of Salt Lake City and the lands about it belong to the Mormons, whose ancestors came here many years before the railroads were built. They called themselves the Church of Jesus Christ of Latter Day Saints. It was in 1847 that one of their prophets, Brigham Young, led them across the plains and over the mountains to this spot, which he said was "the Promised Land." They laid out the city in squares of ten acres each, and planned the streets and parks much as they are to-day.

At that time the whole country about the Great Salt Lake was a desert, but the Mormons turned the mountain streams, which ran through the valley, out over the land and thus changed the desert into prosperous farms. As we travel onward we shall learn that much of the desert can be irrigated in this way and that if its soil can only have water it makes the very best farming land. A large part of our sugar-beet crop is produced on irrigated lands, and this crop supplies much of our sugar.

During our stay in Salt Lake City we see the Mormon Temple, an enormous structure of gray granite, which was about forty years in building and into which no "Gentile" (non-Mormon) is ever admitted. We also visit the tabernacle, in which the Mormons worship on Sunday. It seats eight thousand persons, and has at times held as many as twelve thousand. The building has a roof like the back of a turtle and it looks like an enormous bathtub turned upside down.

Taking automobiles, we ride out through the valley to the Great Salt Lake. This lake is one of the natural wonders of the United States. It is eighty miles long and its average width is about thirty miles. Streams of fresh water are always flowing into it, but it has no outlet, and therefore its waters are salt. They are six times as salty as the ocean, and are said to contain six million tons of salts of one kind or another. The lake is much like the Dead Sea in Palestine.

The waters are so heavy with salt that when we take a swim in the lake we find we cannot possibly sink. We can stand upright in the water, with our heads and shoulders above the surface, and bob up and down like a cork on a fishing line, but try as we may we cannot force ourselves to the bottom. As we stand there with our arms folded gently floating about, we need not be afraid of the crabs biting our toes. One might fish here for years and not get a bite; for the only permanent animal inhabitants are brine shrimps about as long as the nail of a child's finger. There are some birds on the lake, and we see gulls and pelicans flying back and forth to their nesting grounds on some of the islands.

The salts in the Great Salt Lake are not of great value, although they can be cheaply harvested by running them into ponds where the water is evaporated by the rays of the sun. The lake is so far away from our centers of population that transportation is costly and we can get salt more cheaply from other sources. The lake is very shallow, and the Southern Pacific railway has recently built a track across the middle of it, cutting off the original long detour around its northern end (picture on page 19).

1. Take a trip over each of the important trunk lines of the Western Highland, telling something of what you see on the way. Which route is farthest north? Which farthest south? What is the great middle trunk line? Which is operated largely by electricity?

2. What domestic animals are found on the Western Highland? What wild animals? Tell what you can about the prairie-dog villages.

3. What is the most important city of our western plateau? Where is it located, and why has it become such a great commercial and mineral center?

4. Who were the Mormons?

5. Describe your visit to the Great Salt Lake. Compare it with the Dead Sea. (See Carpenter's "Asia.")

LIII. IN UNCLE SAM'S OASES

WE shall take airplanes for our travels this week. The places we wish to visit are so far apart that it would take a month or more to see them all if we traveled by train. They are the reclamation works of the United States government, created to irrigate parts of our great desert region and turn them into oases containing thousands of farms.

The semi-arid region of the United States is mostly in the Great Plains, and the real desert is in the Western Highland where we are traveling. In most of these places the land is fertile if it can only have water. The soil is rich in plant food, and when artificially watered it produces more abundantly than any part of our country which is watered by rain.

About the beginning of this century our scientists showed that dams could be built so that the heavy rains and snows of the mountains could be stored in lakes and reservoirs to be let out as needed. The matter was laid before Congress, and in 1902 a law was enacted which provided that the money received from the sale of government lands in the arid and semi-arid states should be used to put water upon the dry lands. After that the watered lands were to be sold and the money so received was to be used to reclaim other tracts.

There were so many public lands in the arid and semi-arid states, and the sales of the redeemed lands were so great, that before 1920 more than one hundred and thirty million dollars had been spent in such reclamation. At that time the government had created oases larger than all the cultivated farms of Massachusetts, Vermont, Connecticut, Rhode Island, and Delaware. Farmers have settled upon these oases, and the crops they are now raising are said to be worth one hundred million dollars a year. The reclaimed lands lie in all kinds of climate, from the cold lands near the Yellowstone Park in Montana to the semi-tropical lands of southern Arizona. They produce all sorts of crops, from the hardy wheat of the north to the long-staple cotton of the far south, and all kinds of fruit from apples and pears to oranges and dates.

In creating these oases some of the largest dams of the world have been built, rivers have been turned through the mountains by tunnels, and so many canals have been dug that if they could be placed end to end they would reach three times across the United States from Cape Cod to the Golden Gate.

A date palm. This fruit is extensively grown in Arizona and southern California

Roosevelt Dam, Arizona. It holds back a lake large enough to irrigate the Salt River Valley.

But our airplanes are waiting here on the shores of the Great Salt Lake. We climb in and steer for the south. We cross the beautiful valley of the Jordan in Utah, pass over the Grand Canyon of the Colorado in Arizona, and land at the Roosevelt Dam in the Salt River valley. Only a few years ago this region was a desert almost as dry as the sands of Arabia. Now the valley has four towns, more than two hundred thousand acres of farms, and two hundred and sixty-four miles of canals. The land is covered with irrigated fields yielding the finest of raisins, melons, apricots, peaches, and dates, and oranges so large and sweet that they have been called golden balls of bottled sunshine. In the same region hundreds of baby ostriches are hatched every year. We visit the ostrich farms and see the huge birds sitting on their eggs. We are told that the hen ostrich does this work by day and the cock by night. Ostriches delight in the hot sun and they grow fat upon the alfalfa and other vegetation of the irrigated lands.

All this has been made possible by the Roosevelt Dam, a structure of sandstone which holds back one of the largest artificial lakes of our country. The dam extends between the rock walls on each side of the Salt River canyon, and is so made that the water can be held in or let out as needed.

Our next trip is far to the north. We pass over great irrigation works along the Colorado River, and see how hundreds of thousands of acres have been reclaimed in other places upon the plateau. We enter Wyoming and go north to the Yellowstone. Here near the entrance to the national park is the Shoshone (shō-shō′nē) Dam, a great wedge of concrete which blocks the entrance to the canyon of the Shoshone River. The dam is twice as high as Niagara Falls, and the lake which it holds back irrigates more than three thousand farms. Before the dam was built the country about was an uninhabited desert. To-day it is a fertile oasis occupied by more than seven hundred families in three fast-growing towns.

Another ride on our plane brings us to the Pathfinder Dam. This retains the waters of the North Platte River and lets them out as they are needed. The dam is built of granite. It is two hundred and twenty-five feet high and six hundred feet long on the top. It irrigates more than two hundred thousand acres of land. Other notable works are the Elephant-Butte Dam, which crosses the Rio Grande in New Mexico not far from El Paso, and the Arrowrock Dam near Boise (boi′zȧ), Idaho. The first is three hundred and eighteen feet high, and the second has the enormous height of three hundred and fifty-four feet, being almost one hundred feet higher than the dome of the National Capitol at Washington.

There are in all twenty-six of these great government reclamation projects, which when completed will irrigate more than four million acres of land. In addition many tracts of desert, large and small, have been reclaimed by states, by private companies, by the farmers working together, and by individuals, so that in all more than four times as much land has been irrigated by them as by the government projects. We have now over sixteen million acres in the United States artificially watered. California alone has more than three million acres of such land. In every one of our arid and semi-arid states there are thousands of irrigated farms. The same is true in some states of the Mississippi basin.

Going south into Mexico and north into Canada, we shall find many similar regions. Irrigation is largely employed in South America and in Europe and Asia. All of

Sage bush and cactus on a desert before reclamation.

Egypt depends upon irrigation for its farms, and a part of Australia is irrigated. Indeed many of the human race get their living from farms on which rain seldom falls.

The farmers of such regions tell us they would rather depend upon irrigation than upon rain. They know they will always have enough water, and that they can give their crops just the right amount at just the right time. Moreover, they say the land produces more than when watered by rain. In many parts of the West an irrigated patch of ten acres yields as much money as one hundred acres in the rich Mississippi valley; and in the orange country of southern California or the irrigated apple valleys of Oregon and Washington, a tract of six acres often supports a whole family.

The irrigated farms are usually so small that the whole country is more like a village than like the widely separated farm homes of our central, southern, or eastern states. The farmhouses are near together, each having ten, five, or even fewer acres about it; so that the people have to walk but a few steps to talk to their neighbors. In some such settlements the water is piped to every house and barn, and in many as the water falls from the dams it operates electric plants that light the homes of the farmers and give them power for farm machinery. The boys do not have to churn or saw wood, for the water does the work for them. Moreover, the little farms are so near one another that the children can come together at school and for games much more easily than in the regions of the large farms. We shall see many such settlements in the western parts of our country.

1. Where are the arid and semi-arid regions of the United States? What is the character of much of the land and why does it not produce crops?

2. What is irrigation? Mention some of the great reclamation projects undertaken by our government. Make an imaginary visit to one and tell what you see.

3. Would you rather live in an irrigated region or in one watered by rain? Why?

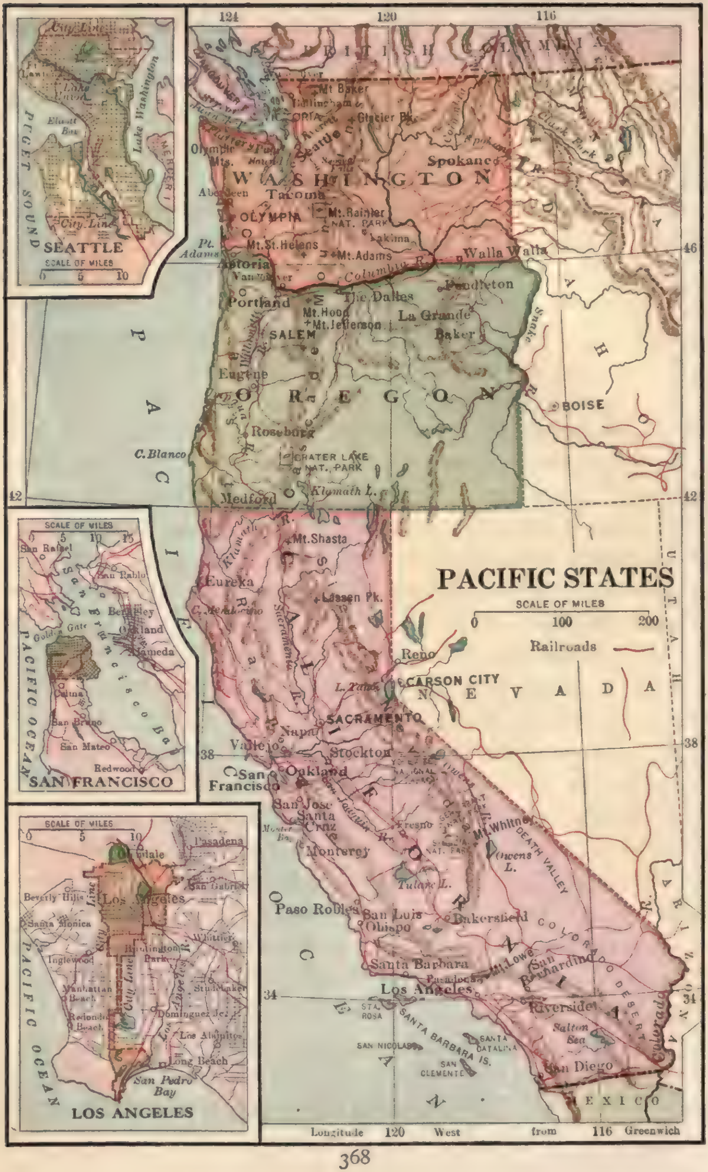
4. Mention a country in Africa where all the farms depend upon irrigation.

LIV. THE PACIFIC COAST STATES — CALIFORNIA

WE have come by airplane from Idaho across the northern part of the Western Plateau and have traveled southward through the Pacific States to get a bird's-eye view of the country. The Pacific States are Washington, Oregon, and California. They are enormous in size compared with our states along the Atlantic coast. Washington is larger than New England, and California is larger than the five states between New Jersey and Georgia. Oregon is almost equal to Pennsylvania, New York, and New Jersey combined.

Our Atlantic coast line is far different from that of the Pacific. It is five hundred miles longer, and from the Hudson River to Florida it is backed by a low plain cut up by rivers through which the tide flows in from the sea. It is only in New England that the land is comparatively high.

The Pacific coast has but few indentations except Puget (pū′jĕt) Sound, the mouth of the Columbia River, and San Francisco Bay. It is bordered by a steep chain of mountains, and most of its cultivated territory is in the valleys between this Coast Range and the Cascades and Sierra Nevada. These valleys are famous for their great


PACIFIC STATES
SCALE OF MILES
0
100
200
Railroads
WASHINGTON
OREGON
CALIFORNIA
IDAHO
NEVADA
UTAH
ARIZONA
MEXICO
BRITISH COLUMBIA
PACIFIC OCEAN
Mt Baker
Bellingham
Glacier Pk.
Seattle
Spokane
Olympic Mts.
Aberdeen
Tacoma
OLYMPIA
Mt. Rainier NAT. PARK
Yakima
Mt.St.Helens
Mt.Adams
Pt. Adams
Astoria
Walla Walla
Vancouver
Columbia R.
Pendleton
Portland
The Dalles
Mt.Hood
Mt.Jefferson
La Grande
SALEM
Baker
Eugene
Snake R.
BOISE
Roseburg
C.Blanco
CRATER LAKE NAT. PARK
Medford
Klamath L.
Mt.Shasta
Eureka
Lassen Pk.
C.Mendocino
Sacramento R.
Reno
CARSON CITY
L.Tahoe
SACRAMENTO
Napa
Vallejo
Stockton
San Francisco
Oakland
San Jose
Santa Cruz
Fresno
Mt.Whitney
DEATH VALLEY
Monterey
Owens L.
Tulare L.
Paso Robles
San Luis Obispo
Bakersfield
COLORADO DESERT
Santa Barbara
Mt.Lowe
San Bernardino
Pasadena
Los Angeles
Riverside
STA. ROSA
SANTA BARBARA IS.
SANTA CATALINA
Salton Sea
SAN NICOLAS
SAN CLEMENTE
San Diego
124
120
116
46
42
38
34
Longitude 120 West from 116 Greenwich
SEATTLE
SCALE OF MILES
0
5
10
City Line
Lake Union
Lake Washington
Elliott Bay
PUGET SOUND
MERCER I.
SAN FRANCISCO
SCALE OF MILES
0
5
10
15
San Rafael
San Pablo
Berkeley
Golden Gate
Oakland
Alameda
San Francisco Bay
Colma
San Bruno
San Mateo
Redwood
PACIFIC OCEAN
LOS ANGELES
SCALE OF MILES
0
5
10
Pasadena
Glendale
Beverly Hills
San Gabriel
Los Angeles
Santa Monica
Whittier
Huntington Park
Inglewood
City Line
Los Angeles R.
Manhattan Beach
Studebaker
Redondo Beach
Dominguez Jc.
Los Alamitos
Long Beach
San Pedro Bay
PACIFIC OCEAN

crops of grain and fruits. In Washington and Oregon are apple and prune orchards, and in California grow oranges, lemons, grapes, prunes, almonds, and olives which are shipped to all parts of the United States.

The mountains near the west coast are far higher than those near the east coast. The Sierra Nevada is several times as high as the Appalachians, and California has the highest peak in the main body of the United States. This is Mt. Whitney, which kisses the sky almost a mile and a half above the top of Mt. Washington.

The climate of each region is excellent, but very different from that of the other. In the eastern part of our country there is an abundant rainfall throughout the year and no irrigation is needed. The coast lands of Washington and Oregon have much rain, mostly in the winter, but in parts of California there is so little rain that the cultivated lands have to be irrigated, while in the far south there are terrible deserts where the land is so barren that only a few animals such as snakes, lizards, and horned toads can live. Death Valley is one of these deserts. Part of it is two hundred and seventy-six feet below the sea level and is the lowest point in the United States.

We begin our travels in southern California. In this part of our country it is like summer all the year round. Flowers are always in bloom and the trees are always green. Los Angeles (lōs ăng′gĕl-ĕs) often has rose festivals to celebrate New Year, and on Christmas one can go out and take a bath in the ocean, come back and have Christmas dinner under the orange trees, and, in the afternoon, by a short railroad ride, reach the snows on the tops of the mountains and eat supper under some of the finest Christmas trees of the world.

Our trip makes us think of Christmas, for we are almost always in sight of some of the things we find in our stockings. We travel through irrigated orchards where golden oranges and pale yellow lemons hang from the trees, and ride for miles through vineyards of the choicest white and blue grapes. Here we see English walnuts and almonds, and there are groves of olive trees, knotty and gnarly. California makes the most delicious raisins, exporting enough in one year to give a pound to every family in the United States. It has thousands of trees on which prune plums are grown, and it exports almost two hundred million pounds of prunes in one year. Prunes are a species of plum. We find them more delicious when just picked than when dried in the sun and packed up for sale. We shall have plenty of prunes also in Oregon when we go there.

Have you ever tasted figs fresh from trees? They are twice as large as when dried and pressed into boxes. They are as sweet as honey, and are delicious with cream. The fig grows so well in California that single trees often yield a thousand pounds in one season.

During our travels we stop now and then to help the children gather walnuts—not black walnuts such as we find in the eastern states, but the thin-shelled English walnuts which are sold everywhere in our grocery stores. The black walnut trees grow wild, but these trees are planted and cared for like fruit trees. They begin to bear at the end of six years, but do not come into full fruiting until long after that. When the nuts are ripe they are shaken or knocked down and then gathered to be cured and packed for shipping.

Almond trees are raised in much the same way. The almond is much like the peach tree, and its flowers are like peach blossoms. The fruit is somewhat similar to

Orange grove in Southern California.

Drying prunes in the sun.

the peach, but the flesh is thin, hard, and leathery; the stone is the almond.

There are more than one million olive trees in California. The olive trees are first sprouted from cuttings in hothouses and then planted in orchards. They begin to bear in seven or eight years, and at ten years a thrifty tree should produce five gallons of olives a year, and when fully grown many times that. A large part of our pickled olives and olive oil come from California, although we import some from Italy and Spain.

More than two thirds of the orange and lemon orchards of the United States are in California, most of the remainder being in Florida. These trees also are carefully cultivated and their fruit is sent on cars and steamers to all parts of the world. Many trainloads of oranges start eastward in cold storage cars every year over the continental trunk lines, and many are shipped to Europe, while some go to far-off New Zealand and to Alaska.

Is this not a wonderful state? Many kinds of vegetation thrive better here than in the eastern part of our country. California grows some pumpkins which weigh as much as a man, and beets as heavy as a good-sized boy. The southern part of the state has elderberry bushes with trunks a foot thick, and at Pasadena is a celebrated rose tree upon which one hundred thousand blossoms may be seen at one time. The state raises also quantities of grain and its vegetables and fruits are canned and shipped all over the world.

The biggest of all trees are to be found on the western slope of the Sierra Nevada. Within a short distance by rail from San Francisco is Sequoia National Park, where are trees more than three fifths as high as the Washington Monument. The "Starr King," for instance, is three hundred and sixty-six feet high, and the "Mother of the Forest" measures three hundred and fifteen feet to its topmost branch, while a half-dozen other trees rise three hundred feet above ground. The trunks of some are so large that a passage big enough for an automobile to pass through has been cut out of them.

These big trees are related to the cedars. They have an evergreen foliage much like the conifers of other parts of our country, and bear cones of small size. Their bark is almost a yard thick. They seldom grow by themselves, but among other trees, towering like giants over those below. They seem to increase in size as we come near them, and at last, when we put our chins against the bark and look upward, their tops seem to pierce the sky, and we cannot realize that they were once little sprouts pushing their way up through the ground.

But that must have been a long time ago. Yes; these trees are said to be the oldest living things upon earth. Some of them were growing long before our Savior was born. They were more than fifteen hundred years old when Columbus discovered the New World, and more than sixteen hundred years old when the first trees were planted by our forefathers on American soil. The biggest of them are in our National Parks, where they will be kept as one of the wonders of the United States.

California has forests of redwood, the trees of which are often eighteen feet thick, and of sugar pine, some of which are two hundred feet high. The state has enough forests to cover New Hampshire, Vermont, Massachusetts, Rhode Island, Delaware, and Maryland, and in its National Forest Reserves there are more than eight million acres.

Another of California's wonders is the Yosemite National Park, which includes a valley a mile deep and only a half mile wide. Here are the Yosemite Falls, which leap from the heights straight down for a quarter of a mile, and then six hundred feet lower in a series of silvery cascades. One of the falls is six hundred feet high. It is known as the Bridal Veil. When the wind blows, the water turns to a spray, making a fleecy white mist, which the sun sometimes transforms to a sheet of most gorgeous rainbows.

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LV. LOS ANGELES AND SAN FRANCISCO

THE four largest cities of our Pacific states are Los Angeles, San Francisco, Portland, and Seattle. All are situated on or near the seacoast, at the ends of the railroads which cross the continents. They all have excellent harbors, so that goods can be shipped to and from them by sea as well as by land. From these cities great steamers go out almost daily to the Panama Canal, to Japan, China, and far-off Australia, as well as to Alaska, Hawaii, and the Philippine Islands. They are the western gateways through which we pass back and forth between our country and Asia and our possessions in the Pacific Ocean.

We shall begin our travels in Los Angeles. The name means "City of the Angels," and the people tell us that their climate is heavenly. Los Angeles has neither winter nor summer. It is in the semi-tropics, and has only a wet and a dry season, but even during the wet season the sun is glorious after each rain. The city has more than three hundred days of sunshine during the year.

As we ride through the residence sections we seem to be in a botanical garden. The wide streets are shaded with tropical trees, including palms of different varieties. There are also India rubber trees with smooth bark, pepper trees with red berries, and orange trees with golden fruit shining out of the leaves. There are great hedges of geraniums and calla lilies, and in the country about are wild poppies as yellow as gold. Immense rosebushes, which blossom all the year round, are to be seen everywhere. At Pasadena, not far from Los Angeles, the people have a "Tournament of Roses" each year, with battles in which both the bombs and the bullets are flowers. At the same time is held a most gorgeous floral parade.

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Boulevard in Los Angeles. Notice the tropical foliage.

There are no finer roads anywhere than in southern California, and we may motor for miles out of Los Angeles in every direction through irrigated vineyards and groves of oranges and lemons and of walnuts, almonds, and olives.

In many places we see men picking the fruit. We pass motor trucks filled with it and see long railway trains carrying their cargoes of oranges and lemons to the east. There are many fruit-canning factories, and we notice great trays of raisins drying in the hot sun.

Los Angeles is a large and magnificent city. Its population is greater than that of any other city on the Pacific coast of America. It has big business buildings and many of the finest homes of the United States. There are many libraries and schools, and playgrounds every few blocks.

During our stay we ride down to the harbor to greet some friends from a steamer which has just arrived from the Panama Canal, and then take a boat to Long Beach to have a swim in the sea. We visit an ostrich farm outside the city and, coming back, take the cog railroad up Mount Lowe for a view of the country.

Later we go to some of the parks and buildings where films for motion pictures are made. The "movie" men have us pose for them, and we wonder what our parents will think when they see us trotting out on the screen. Los Angeles has many studios for making motion pictures, and many of the best of the film actors have their homes here.

The water supply of Los Angeles comes from Owens River, which is farther away from Los Angeles than the distance between Washington and New York. The water is brought down to the city through a huge aqueduct of stone, concrete, and steel, which cuts its way through the mountains and over the desert, making a drop of fifteen hundred feet on the way. In making the aqueduct miles of tunnels and siphons had to be built; for the water moves by gravity only and no pumping plants are required. The undertaking cost more than twenty-five million dollars, but by it Los Angeles has all the water it can ever possibly need, and in addition enough to irrigate one hundred thousand acres of farms. Moreover, the fall is so great that it will supply one hundred and twenty thousand horsepower, and the electricity so generated will light the whole city and run its street cars and factories. We see hundreds of oil wells not far from Los Angeles, and learn that Los Angeles uses petroleum for fuel. California is one of the chief oil states of the Union. In some years it has produced enough to give several barrels of petroleum to every family in our country.

Oil wells, Bakersfield, California. Much of the oil from this region is used on trans-Pacific steamers.

Our next journey is northward by train through the central valley of California to San Francisco. The distance is four hundred and seventy-five miles, and there are grain fields, orchards, and vineyards almost all the way. It is hot in the valley, but we find San Francisco delightfully cool. The climate of this city is such that light overcoats and furs can be worn the year round, and the breezes from the ocean put life into one's veins.

We first take a steamer and ride around in the harbor. San Francisco lies on a peninsula between San Francisco Bay and the ocean, facing the Golden Gate, which is a passage a mile or so wide connecting the Bay with the ocean. The Bay covers more than four hundred square miles and it is so protected that the whole of it can be used as a harbor. The average depth of the water is more than sixty feet. It is the largest land-locked harbor of the world. The harbor front is owned by the state, and when the present plans are completed, the wharves, docks, and piers will be more than fifty miles long.

It was this fine harbor that formed the principal gateway to the gold fields when they were discovered. At that time ships came in bringing gold hunters from all parts of the world, and San Francisco began to grow. Within two years it rose from a village to a city of twenty-five thousand. It has now a population of more than a half million, and its people say it will some day have one million or more. The first of the great railroads to cross the continent started eastward from here, and one can now go by several trunk lines to almost any part of the Union. As we float about in the harbor we see steamers which have just come in from Yokoha′ma and Ko′be, Hongkong, and Shanghai, and we see others starting out for Honolulu (hō-nō-lo͞o′lo͞o), Auckland, Sydney, and

Melbourne. The latter ships will call at Samoa on their way south and leave passengers and freight for our colonists there. There is also a transport with many soldiers on board. It is bound for Manila, and will stop over a day at the Hawaiian (hä-wī′yan) Islands.

Leaving the harbor, we walk up through the business section, where the skyscrapers are so large that they make us think of New York and Chicago, and then ride on the cable cars up Nob Hill. Here we see the houses of millionaires who have grown rich out of the resources of this very rich state, or who have made fortunes in Alaska and in the Hawaiian Islands.

During our stay in San Francisco we look about in vain for signs of the earthquake and fire which occurred here in 1906. At that time some of the streets cracked wide open, chimneys tumbled down, and some large buildings fell into ruin. The water mains were broken, and fires could not be put out. More than four hundred people were killed, and several million dollars' worth of property destroyed.

We take a photograph of the statue of Robert Louis Stevenson in one of the squares, and then drive out to Golden Gate Park, which consists of one thousand acres of gardens and trees overlooking the ocean. It has nine baseball diamonds, but the teams we see playing are so much like our own teams at home that we soon leave the "bleachers." We go on to the Cliff House to watch the sea lions sport about in the water and bask in the sun on the rocks. Some of these huge animals are twelve feet in length, and weigh half a ton each. Their barking is so loud that we can hear it above the roar of the breakers. It makes us think of a hundred automobiles all honking at once.

We cross the Bay by the ferry to Oakland, another large

View of San Francisco and its harbor.

city, in which many of the men who do business in San Francisco have their homes, and from there we go to Berkeley to see the University of California, and later to Stanford, another great institution of learning.

Coming back to San Francisco and strolling about through the streets, we are surprised at the many strange faces. The people come from all parts of the world. Most of them are Americans, but there are also Germans, Italians, Spaniards, Russians, and Jews. There are hundreds of Japanese, many of whom own gardens and farms not far from the city, and there are more Chinese than in any other part of the United States.

The Chinese have a settlement at the foot of Nob Hill, which covers a dozen or more city blocks. It is called Chinatown, and in it are Chinese stores, temples, and houses. The signs of the stores make us think of the characters on tea boxes. Some of the Chinese wear the same clothes as their brothers and sisters of Asia. The boys have on gowns with long sleeves, and little black caps with buttons on top. Some of them stand or sit on the streets, and stare at us with their twinkling almond-shaped black eyes as we go by.

1. Compare our Pacific coastline with the Atlantic coast. Which is the longer? Why? Compare the mountain ranges of the Pacific with those along the Atlantic. Where do the cultivated lands of each region lie? Name some of the crops of each.

2. Compare the climate of the two regions. Where on the Pacific coast does the most rain fall? The least? Describe Death Valley.

3. Compare your own state in size with each of the three Pacific coast states. Compare California in size with the Atlantic states.

4. What part of California might be called "Christmas Land?" Why? What fruits are raised there? Bring some of the fruits to class and let each tell the story of how it is raised. (For oranges,

lemons and grapefruit, and olives, figs, and dates, see Carpenter's "How the World is Fed," pages 259-287).

5. Imagine a Christmas Day in Los Angeles. What might you have to eat and how could you spend the day?

6. Give some idea of the forests of California. What are the big trees? Describe them.

7. Name the four largest cities of the Pacific States, and compare them in size with the place in which you live. (See page 494.) Give some reason why each has become great.

8. Take a trip through Los Angeles and tell what you see. Describe how this city in a semi-arid region gets its water supply. Where does much of its fuel come from?

9. Where is the Golden Gate? Can you imagine a reason why it was so named?

10. Describe the harbor of San Francisco. Give some reasons why the city has grown. Trace a shipment of canned fruit from San Francisco to Yokohama. To London. What is the distance in each case?

11. What people from Asia do we see here? What do you know about the Japanese? The Chinese? (See Carpenter's "Asia").

LVI. THE PACIFIC NORTHWEST — PORTLAND

WE have left San Francisco and come north to Portland. The distance between the two cities is greater than between Philadelphia and Detroit, and the way was dry and dusty notwithstanding our oil-burning locomotives. We went north through the Sacramento valley, so noted for its crops that it is called the granary of California, and spent a day within sight of Mt. Shasta, a snow-capped, extinct volcano, about forty miles from the Oregon boundary.

Entering Oregon, we found the land greener, and we now and then passed through forests. We went by orchards of prune plums, apples, and English walnuts, and saw many little cities and towns.

We are now in the Pacific Northwest, composed of Washington and Oregon. These two states have about four times as much land as Virginia or twenty times as much as Massachusetts. They have plains, high mountains and valleys, lands almost desert, and some regions where the rainfall is from seventy to one hundred inches a year. The Cascade Mountains, which run north and south through them, divide the wet and dry sections. To the east lie the arid lands, much of which have to be irrigated, and in the west are the wet lands where the rains give bountiful crops.

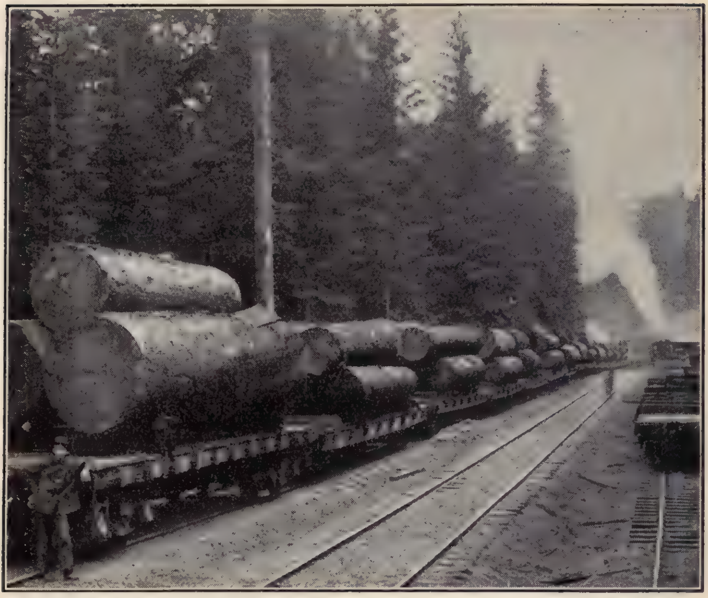
Most of our travels will be west of the Cascades. This part of our country has a milder climate than any other in the same latitude. Oregon is warmer than Massachusetts, and the winters of Puget Sound are milder than those of Washington, D. C. It seldom snows west of the Cascades, and the winter climate of Portland is milder than that of Tennessee or Kentucky. Nevertheless Portland is farther north than St. Paul, and Seattle is much nearer the North Pole than Quebec. The reason for the mild climate lies in the winds from the Pacific Ocean, which blow over the land. As the winds go on to the eastward they drop their load of water, and lose their heat; so that the winters of Montana and North Dakota are dry and exceedingly cold.

Some of the largest forests of the United States are to be found on the western slope of the Cascades in Washington and Oregon. The forests of Oregon are of enormous extent, and in Washington so much timber is being cut each year that if it were all made into boards an inch thick there would be enough to cover a road eight feet wide clear around the world. Washington is said to have two hundred billion feet of timber still standing. It produces more annually than any other state, with Louisiana next and Oregon third.

These woodlands of the Pacific Northwest far surpass in the extent of their timber anything we have in the East. The chief tree is the Douglas fir. Many of these firs shoot up as high as a tall church steeple before they put out a branch, and with the branches they may perhaps reach a hundred feet higher. Some of the trees are as big around as the Pullman sleeper in which we came north to Portland, and the logs are so heavy that a single one often forms a load for a freight car. Now and then a big tree is hollow, and it is said that a Washington settler used such a tree as a house while clearing his farm. The hole inside the tree was twenty-two feet in diameter and forty feet high. He put in a floor eight feet from the ground and used the space under it as a stable for his horse and cow. He had two living floors above this, and a knot hole formed his chimney.

Some of the best timber of the world comes from the Pacific Northwest. The logs are sawed into lumber and shipped in giant rafts to the ocean. They are carried across the mountains to the Mississippi basin by the trainload, a single locomotive sometimes hauling as much as a half million feet of lumber.

Logging in this western country is different from that which we saw in the South and near the Great Lakes. There is little or no snow in the woods, and the logs are dragged about by steam engines and often taken on cars to the mills. They are so heavy that they have to be loaded by cables of steel as thick as a broom handle. Such a cable pulled by steam engines will lift a forty-foot log five feet in thickness and drop it on the platform of a freight train.



Shipping logs to the mills in the Pacific Northwest. Compare the thickness of the log in the foreground with the height of the man below it.

In felling the trees the lumbermen first cut a gash so large that a man could lie down in it, and then they cut through the great trunk with a crosscut saw drawn back and forth by a man at each end. This takes a short time, and the giant of the forest falls with a crash to the ground. The trunk is sawed into logs, which the steam engines haul to the railroads by cables and load on the cars.

The Pacific Northwest is one of our richest farming regions. It has many grain fields and orchards which are watered by rain, and thousands of others kept moist by irrigation. Its apples command the highest prices in the markets of South America and Europe, and they are sold on our fruit stands throughout the East.

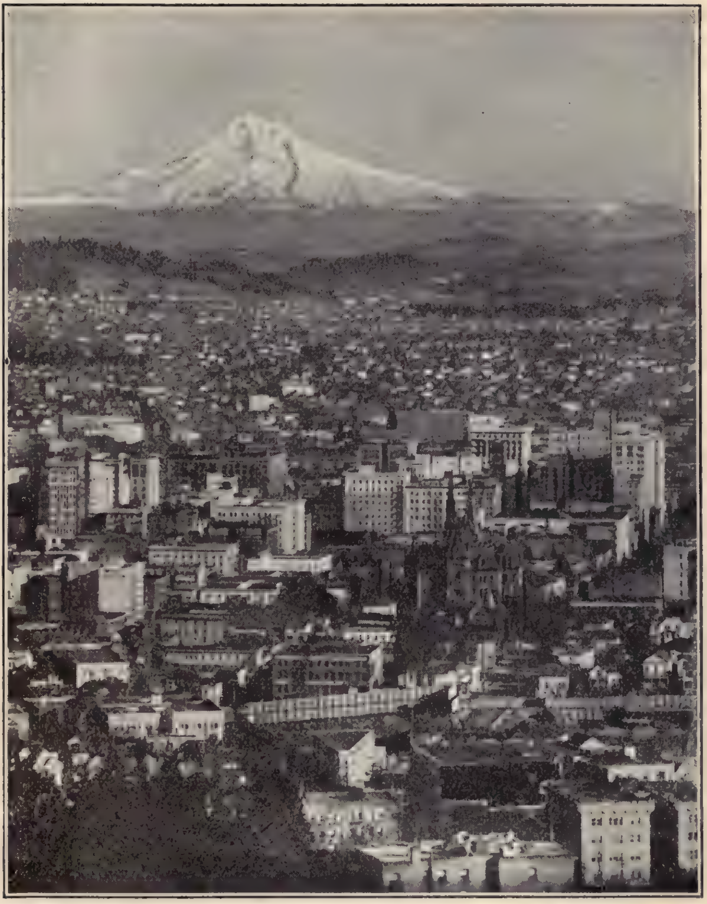
We are delighted with Portland. The city is like a great park of homes, gardens, and trees, in the center of which are the public buildings and fine business structures. The climate is so mild that flowers bloom both summer and winter, and there are so many roses that the place is called the "Rose City." A rose festival is held annually the first week in June. The flowers here remind us of Pasadena.

Portland lies on both sides of the Willam′ette River, a few miles from where it flows into the mighty Columbia. It is a little more than one hundred miles from the ocean, and the Columbia and Willamette are so deep that large ocean vessels make this one of their ports. We see freighters from Japan and elsewhere loaded with lumber, grain, and fruit for shipment abroad.

During our stay we take electric cars to Council Crest for the view. This place is high above the city, and as we stand there we can see far and wide over the rich Willamette valley with its farms and orchards. There are five extinct volcanoes in sight, each of which is crowned with perpetual snow. They are Mounts Rainier, Hood, Adams, Jefferson, and St. Helens.

As we ride back to Portland the conductor tells us that the current which moves our car is created by waterfalls in the mountains, and that the city has enough such power to run its car lines, operate its factories, light all its streets, and furnish light and heat for many of its houses. In hundreds of Portland homes all the cooking is done by electricity.

Taking automobiles, we motor for miles over the famous automobile roads through the gorge of the Columbia



Portland, Oregon. It is built on hills rising from both sides of the Willamette River. Mt. Hood, sixty miles east, is seen in the background. Its lofty peak is always covered with snow.

In the Cascade Mountains. The Columbia River highway, shown here, has some of the most beautiful scenery of the Far West.

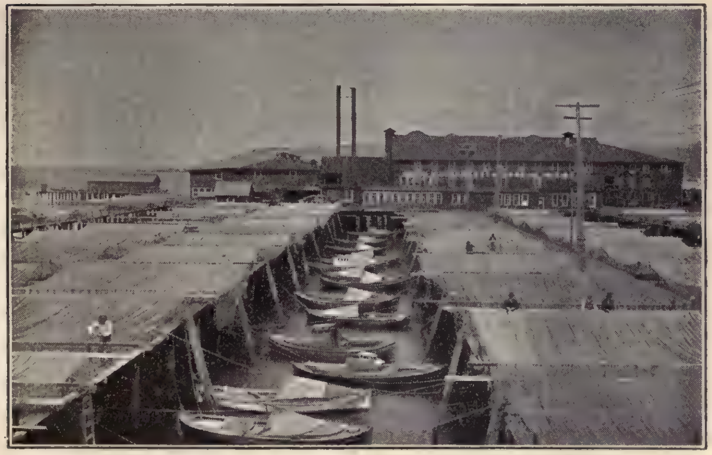
River, going west to the old trading post of Astoria on the shores of the Pacific, and east to the Dalles (dălz), a distance of about two hundred miles. We visit Columbia Gorge Park, where fourteen thousand acres have been set aside by the government as a national playground, and wish we could go south to Crater Lake Park, or take some of the many mountain climbs so popular in this part of our land.

However, we have time only for a sail up the Columbia

River to see salmon caught. The Pacific Northwest has one of the famous fishing grounds of the world. The waters of this part of the ocean abound in salmon, which come up the rivers at certain times of the year, and are caught in such great quantities that they are shipped all over the world. Hundreds of millions of pounds of them are put up in cans, and in this shape may be bought in almost any grocery store. Immense quantities are frozen whole and sent to the East in cold storage cars, so that one can have a fresh salmon from Washington, Oregon, or Alaska, in almost any American city.

The salmon served on the boat which takes us up the Columbia is fresh from the water. It is cut into great slices and brought smoking hot to the table as salmon steaks. It seems to us we have never tasted salmon before.

Salmon spend most of their lives in the ocean, but they are hatched in the fresh-water streams of the land. They



Drying salmon nets at a cannery on the Columbia River.

spend their babyhood there, and then go out to sea, where they live three or four years, and then swim back to the places where they were hatched to lay their eggs and to die.

When they come in from the sea the salmon move in great schools, filling the smaller streams and often the rivers. They are caught in nets and traps, and sometimes in fish wheels so fastened to the end of a boat that the wheel is turned by the current. Wire nets are attached to the rim of the wheel, and the fish rush into the nets and are lifted up by the current which keeps the wheel moving. As the wheel turns the salmon slide off into a trough on the boat. Such fishing may be seen in many places in the Pacific Northwest. It is common also in the streams of British Columbia, and even in the Yukon and other rivers of Alaska.

LVII. PUGET SOUND AND THE INLAND EMPIRE

WE have returned to Portland, taken the train, and ridden a day northward to Seattle on Puget Sound. We are now on a great inlet from the ocean, so beautiful that it is sometimes called the American Mediterranean. The sound covers an area about twice the size of Rhode Island, and its shores wind about to such an extent that if they were stretched out in one line they would reach farther than from here to Los Angeles. There are many beautiful islands in the Sound, and some of the finest snow-capped mountains of the United States look down upon it. It has a mild climate, and the rains are so frequent that during most of the year the land all about is covered with green.

The waters of Puget Sound are so deep that ocean steamers can anchor almost anywhere in it. It has many fine harbors, and Seattle is so favored as to seagoing and shipping arrangements that it has become the chief port of the Pacific Northwest. It has an immense water front, and this is connected by a ship canal with Lake Washington, at the east of the city. Steamers can pass through the locks into the lake and have safe anchorage there. This enables them to get rid of the barnacles, little shellfish which attach themselves to the hulls of ocean vessels in such numbers that they often greatly reduce their speed. These barnacles cannot live in fresh water, and after a short while in the lake the steamers are clean.

The railway facilities of Seattle are equal to those afforded by steamships. The Great Northern, the Northern Pacific, and the Chicago, Milwaukee, and St. Paul connect it with the east, and a branch of the Canadian Pacific Railway connects it with Canada.

The harbor of Seattle is filled with shipping from all parts of the world. As we walk along the wharves we see men unloading raw silk and tea from Yokohama and Shanghai, jute from Calcutta, hides and furs from Siberia, hemp from Manila, and rubber from Singapore and Ceylon. Among the principal exports is fish, for Seattle is the chief fish market of the Pacific Coast fleet. Its vessels go far and wide over the ocean, and many bring in cargoes of fish from southern Alaska. More than twenty-seven thousand tons of salmon, cod, and herring are shipped away in one year, as well as a large amount of halibut. The canned salmon annually exported is enough to give five cans to every family in the United States and have some to spare. It goes to all parts of the world.

We have a fine lesson in geography by trying to follow

Business district of Seattle, looking across Puget Sound to the Olympic Mountains.

the shipments to the places to which the officials of the port tell us they go. In one year Seattle sent more than one hundred thousand pounds of canned salmon to Hongkong; more than a half million pounds to Africa, and three hundred thousand pounds to far-away India. It exported three fourths of a million pounds to Mexico, sixty thousand pounds to Aden, Arabia, and about five million pounds to the Philippine Islands. Europe took an immense quantity, and more than one million pounds went to Australia.

The lumber exports of Seattle annually amount to tens of millions of feet. They go to South America, Australia, Asia, and Europe, and to the Hawaiian and Philippine Islands. More than eighty thousand carloads are shipped from here over the railroads to the east. Join these cars together, giving fifty feet to each car, and they would make a solid lumber train as long as from Louisville to New Orleans. Among the chief lumber shipments are red cedar shingles. About two thirds of all the wood shingles of the United States come from here.

We are surprised at the beauty of Seattle. The city is so surrounded by water, that one is almost always in sight of the sea. A stream, or a beautiful lake, and the snow-capped peaks of the Olympic and other high mountains are always in view.

Within a day's journey is Mt. Rainier, which is three hundred feet higher than Pikes Peak, and has fifty thousand acres of glaciers upon it. To the north is Mt. Baker, which has seven great glaciers, and to the northeast is a white sugar loaf known as Glacier Peak, with several glaciers flowing down from its snows.

Leaving Seattle, a motor-car ride of an hour or so takes us to Taco′ma, another fine ocean port on the Sound. It

Apple orchards on irrigated land in the Inland Empire.

is not so large as Seattle, but it is quite as beautiful and has equally good railway and shipping facilities. It is the chief grain and fruit port of this region.

Tacoma is a large manufacturing center, largely because of its cheap electric power from the Snoqual′mie Falls and other waters of the Cascades near by. The Snoqualmie Falls are almost twice as high as Niagara. They furnish thousands of horsepower of electricity which is carried by cables more than forty miles to the consumers. Additional energy is supplied by other falls in the mountains, and there is so much water power within easy reach of the two cities that the people tell us they will some day have enough for all sorts of industries.

The mountains of our Pacific slope are unsurpassed in their store of white coal, as water power is sometimes called. Much of the work in California is done by electricity generated by such power, and there is so much available in Oregon and Washington that the two states could create, it is estimated, a greater horsepower than all the water from the Great Lakes which drops down at Niagara. The possible amount is estimated at more than seven million horse-power. One fourth of all the water power of the United States is to be found on the Pacific Coast.

But let us take the train and go to the eastern side of the Cascade Mountains to see something of the semi-arid part of the Pacific Northwest. Beyond the Cascades is a vast tract known as the Inland Empire, comprising eastern Washington and Oregon and a part of northern Idaho. This tract equals in extent all of New England, New York, New Jersey, Pennsylvania, and Maryland combined.

This great territory was once deeply covered with lava, the surface of which has broken down into a rich soil. It was long supposed to be too dry for farming, but it has been found to grow excellent wheat, and it now produces grain by the millions of bushels a year. There are many fine orchards and in the valleys are large tracts of irrigated land.

Spokane (spō-kăn′) is the commercial capital of the Inland Empire. It lies on both sides of the Spokane River, which rushes through the city in a gorge, dashing down in fall after fall for a distance of one hundred and thirty-two feet. The waters boil and foam as they drop from level to level, sending up a silvery spray. They furnish a great water power, and to take advantage of this the people have put in huge pipes through which the water falls upon turbines, thus generating the electricity which not only lights the city and operates its mills and factories, but is also sent far out into the country.

1. What states compose our Pacific Northwest? Compare each with your own state in size and character.

2. Why are the winters of Washington mild and those of Montana and North Dakota bitterly cold?

3. Where are the chief forests of the Pacific Northwest found? Why? Visit a lumber camp and tell what you see. Trace a cargo of lumber from Portland by two routes to Buenos Aires. From Seattle to Yokohama. To Shanghai.

4. Visit Portland and show why it has become a rich city. For what flower is it noted?

5. What fish do we find in large quantities in the Pacific Northwest? Tell the life history of one of them. (See Carpenter's "How the World is Fed," pages 163-170.)

6. Locate Puget Sound. Why is it sometimes called the "American Mediterranean?" What are the two chief cities upon it? Which is the larger?

7. What advantage to an ocean port is a fresh water lake with which it is connected?

8. Mention some of the imports and exports of Seattle, telling from what place they come and to what place they go.

9. What is the Inland Empire? Describe its chief city, and some of its products.

LVIII. AMONG THE INDIANS

WE have seen many Indians in our travels west of the Mississippi River, especially in the Plateau and Pacific States. When we were crossing the Western Highland by train the Indians came to the stations to sell us pottery and baskets, and purses and moccasins made of skins embroidered with beads. In the Southwest we saw the homes of the ancient cliffdwellers. In that part of the country some Indians still live in houses built one on top of another, so that they climb on ladders from house to house. The roofs of the lower houses form the playgrounds for the children above, and the dogs as well as the children climb up and down the stone steps and ladders from roof to roof. These are the homes of the Pueblo Indians, who are in many ways civilized. They cultivate farms on the lowlands, have orchards surrounded by stone walls, and raise watermelons, cantaloupes, corn, beans, and pumpkins. Some of the tribes make beautiful blankets and baskets which are sold for high prices in many of our stores.

Among the Pueblo Indians are the Hopi (hō′pē) of New Mexico and Arizona, who are good farmers and weavers. They have always had towns built high up on bluffs in order to be safe from wild animals and to protect themselves from their enemies. They have no enemies now, but some of them still continue this practice. The Hopi have many masked dances, including the snake dance, during which they carry live rattlesnakes around in their mouths.

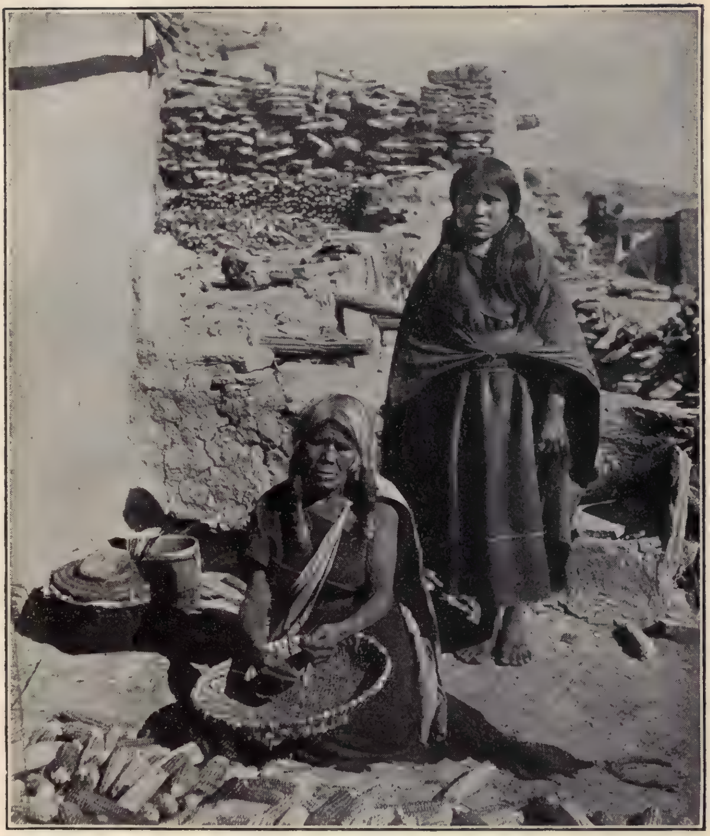
There are many Nav′aho Indians in Arizona, New Mexico, and Utah. They have round huts made of poles covered with earth, with holes in the tops for chimneys.

They weave beautiful blankets, some of which sell for several hundred dollars apiece.

There are more than thirty thousand Indians in Arizona, about twenty thousand in New Mexico, seventeen thousand in California, sixteen thousand in South Dakota, and twelve thousand in North Carolina. Oklahoma, which was once known as the Indian Territory, has about sixty thousand Indians, much of the land having been set aside for the five civilized tribes. There are red men scattered over other parts of the United States, many on tracts reserved for them by the government, some on lands which they own individually, and others employed in various ways. During the World War we had Indian scouts with the army in France, and among our trained nurses were three Indian girls. We can get an Indian scout almost anywhere in the Rockies if we wish to go hunting or fishing, and if we do we shall not be surprised to hear him speak English and learn that he went to school as we do.

Our government has established many schools for the Indians, and we have now about fifty thousand young redskins going to school. If we should visit Oklahoma we should find that some of the Indian boys and girls stand quite as high in their studies as do the white children. Some of the men have fine farms and their boys have their own pig clubs and baby beef clubs and corn clubs.

The Indian school children dress much as we do. In fact, the Indian who wore feathers in his hair and was clad only in skins has long since passed away. On many of the reservations the babies are still kept in bags of skin covered with beads and arranged in such a way that a mother can carry her baby about on her back, and the Indians still wear blankets over their clothes. Both men and women wear their hair long, the men sometimes gath-



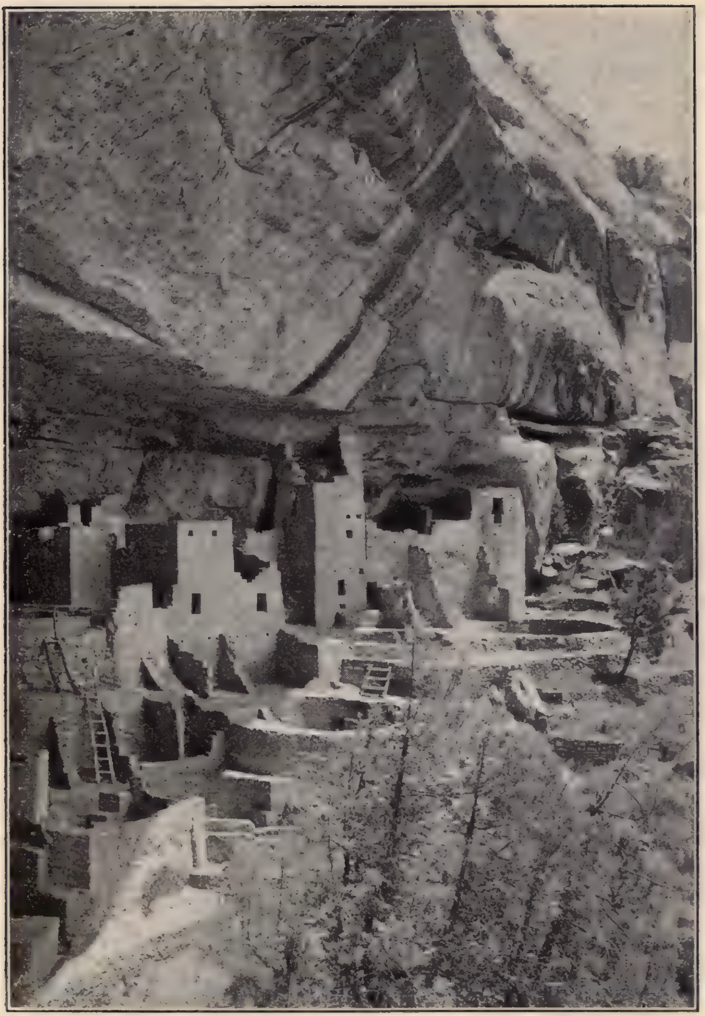
Pueblo Indian woman and daughter. These people are skilled in making pottery and weaving baskets and blankets. The woman here is engaged in weaving a basket. In the foreground is a pile of corn, one of the chief foods of these people. It is ground into meal between stones.

ering it into two great braids at the front, but as a rule the Indians dress like the whites, and they are fast coming to live in much the same way.

Indian babies, or papooses. They are carried in these baskets slung on the mother's back.

In Oklahoma, the Cherokees′, Chickasaws, Choctaws, Creeks, and Sem′i-noles, who were called the five civilized tribes, have had their reservations divided among them so that each member of the tribes received a large amount of land. Many of them have beautiful houses and prosperous farms. Some of them have made fortunes out of the oil found on their lands, and others have grown rich in different ways. These people have schools and churches. They are among the Indians who vote, and not long ago we had an Indian who was Registrar of the Treasury, and whose name appeared on every bank note and Liberty Bond.

But who are these people and where did they come from? We know that they have copper-colored skins, and that they are called the Red Race. They have high cheek bones, straight noses, black eyes, and coarse black hair. Both men and women part their hair in the middle.



Ruins of Cliff Palace, in Mesa Verde National Park, Colorado, once the home of prehistoric cliffdwelling Indians. It is built of cut stone held together by mortar, and contained 200 rooms.

The features of many of the Indians are much like those of the Mongolians that one sees in north China and Siberia. For that reason it is supposed that they came from Asia across Bering Strait ages ago and settled in North and South America. The Indians were the only people who inhabited the New World when Columbus made his great discovery, and it has been estimated that there were at that time about half a million Indians north of the Mexican boundary, most of whom lived in the United States. Now we have less than three hundred thousand, including those in Alaska, and there are only about one hundred thousand in Canada.

The Indians of the past were of many tribes, with different languages, customs, and means of existence. In the great forests of the East, they were hardy and warlike, living almost altogether by hunting and fishing, although some had small patches of corn and tobacco, and others made use of wild rice as food. In the southeastern part of the country, north of the Gulf of Mexico, the Indians had permanent villages. They cultivated farms, made pottery, wove cloth, and knitted cloaks of turkey feathers.

In the southwestern part of our country many of the Indians engaged in agriculture, and on the plateau they lived largely by fishing and by hunting the buffalo and other wild animals.

The ancient California Indians of our Far West were skilled in making baskets and pottery as they are now, and along the North Pacific coast, where there was plenty of wood, the Indians made their houses of split planks, and had dishes, bowls, and spoons of wood. Most of these Indians live in plank houses to-day. They are excellent fishermen, and are skilled in handling canoes and boats of all kinds. We shall meet many of them during our trip to Alaska.

1. What race inhabited North America when the New World was discovered? How many people of this race then lived north of our Mexican boundary? About how many live there now?

2. Find out all you can about the customs of the Indians before America was settled. How do many of them live now?

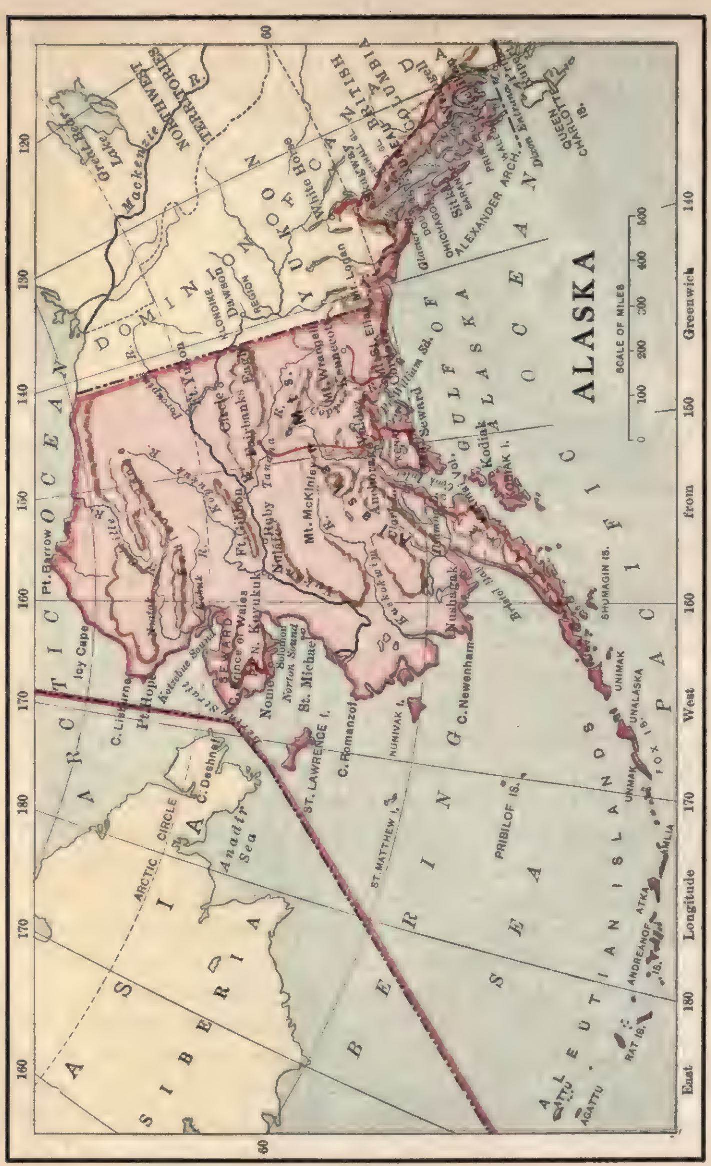
3. Name the five civilized tribes. In what state are most of these Indians to be found?

LIX. AN AIRPLANE FLIGHT THROUGH ALASKA

WE have come back to Seattle by train and are now high up in the air in a fleet of airplanes flying north to Alaska. The territory is so large and so full of strange things that we have not time to explore it all during this journey.

As we look at Alaska on the map, it is hard to realize that the territory has an area of almost six hundred thousand square miles. It is one third larger than all of our country north of Tennessee and east of the Mississippi River. From north to south it is about as long as from Canada to Mexico; and from east to west so long that if the whole territory could be lifted up and dropped down upon the United States with the easternmost point touching the Atlantic Ocean at Savannah, the westernmost point would be at Los Angeles on the Pacific. The Aleutian (a-lū′shan) Islands, which are a part of Alaska, extend almost to Japan, and Bering Strait is so narrow that we can fly from North America to Asia and back in about twenty-five minutes. The distance is forty miles.

The Alaskan coastline with its windings is longer than the distance around the world at the equator, and if the navigable rivers were stretched out end to end, they would reach several thousand miles. The Yukon River is fifth


ALASKA
SCALE OF MILES
0 100 200 300 400 500
Longitude West from Greenwich
East
ARCTIC OCEAN
PACIFIC OCEAN
BERING SEA
GULF OF ALASKA
DOMINION OF CANADA
YUKON
BRITISH COLUMBIA
NORTHWEST TERRITORIES
SIBERIA
ASIA
ALEUTIAN ISLANDS
ARCTIC CIRCLE
Great Bear Lake
Mackenzie R.
KLONDIKE REGION
Dawson
White Horse
Mt. Logan
Mt. St. Elias
Juneau
Sitka
BARANOF I.
CHICHAGOF I.
ADMIRALTY I.
PRINCE OF WALES I.
ALEXANDER ARCH.
Dixon Entrance
Prince Rupert
QUEEN CHARLOTTE IS.
Glacier Bay
Skagway
Mt. Wrangell
Copper R.
Cordova
Valdez
Prince William Sd.
Seward
KENAI PEN.
Cook Inlet
Anchorage
Mt. McKinley
Kodiak
KODIAK I.
Katmai Vol.
Alaska Pen.
SHUMAGIN IS.
UNIMAK
UNALASKA
FOX IS.
UMNAK
AMLIA
ATKA
ANDREANOF IS.
RAT IS.
ATTU
AGATTU
Bristol Bay
Nushagak
Kuskokwim R.
C. Newenham
NUNIVAK I.
PRIBILOF IS.
ST. MATTHEW I.
ST. LAWRENCE I.
C. Romanzof
St. Michael
Norton Sound
Solomon
Nome
SEWARD PEN.
C. Prince of Wales
Bering Strait
Kotzebue Sound
Pt. Hope
C. Lisburne
Icy Cape
Pt. Barrow
Colville R.
Noatak R.
Kobuk R.
Koyukuk R.
Yukon R.
Tanana R.
Fairbanks
Circle
Ft. Yukon
Porcupine R.
Eagle
Ft. Gibbon
Ruby
Nulato
Kuyukuk
C. Deshnef
Anadir Sea
60
120
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160
170
180

in size on the North American continent, and on the Kus′kokwim, to the south of it, small steamers can go into the interior as far as from New York to Cleveland, The Tanana (tä-nä-nä′) River is navigable from the Yukon to Fairbanks at the head of the government railway. Another tributary, the Porcupine, gives access by boat far to the northeast, and miners go in small steamers far up the Koyukuk (kô-yōō′-kŏŏk) to wash out gold from its sands.

This land is one of magnificent scenery. It has the highest mountains of the North American continent, glaciers which surpass in extent any in Europe or Asia, and enormous volcanoes, such as Katmai, which recently sent forth clouds of ashes that darkened the sky and coated the country about with such a thick covering that the land seemed to be covered with snow. Alaska has great valleys, some of which have thick woods filled with deer, bear, and moose; mossy tundras upon which reindeer feed; and cold, dry plains many miles in extent.

The country is one of many climates. Along the coast of southeastern Alaska, because of the warm winds from the ocean, the winters are no colder than those of Virginia, and in Juneau (jōō′nō), the capital, the weather is as mild as in Washington, D. C. Farther west along the south coast, and in the Aleutian Islands, for the same reason, the climate is mild, but over the mountains it is dry and bitterly cold. In the interior of Alaska, the thermometer often falls to sixty or seventy degrees below zero, and at Fairbanks, in the Tanana valley, when the winter weather is twenty below the people think it is fine. There and in the far north the winter sun comes out for only a few hours at midday, and at Point Barrow for forty days in midwinter it does not come out at all. Just now it is midsummer and we shall fly over many places north of the

Wright Glacier, Alaska; one of forty-five glaciers seen from Taku Inlet.

Yukon where the sun is still shining at midnight. We shall be able to take photographs from our airplanes at one o'clock in the morning, and may perhaps get a snapshot of a baseball game at one of the mining camps, for sports are sometimes held at that hour.

But all this while we have been flying northward along the moist warm coast of British Columbia. We are now crossing Dixon Strait and entering southeast Alaska. That pretty little town with its houses of wood and brick hugging the mountains is Ketchikan′. It lies just north of the boundary between Alaska and Canada. These beautiful islands covered with green, their tops crowned with snow, belong to the Alexander Archipelago, which runs from here for several hundred miles along the west coast.

How it rains! As the water pours down upon us, we are reminded of the reply of a Ketchikan man to a tourist who landed in a similar storm. The tourist asked:

"Does it rain always like this in Ketchikan?"

"I don't know," was the reply. "I have lived here only seventeen years."

As we go on to the north the sun comes out now and then, and the land is glorious under its rays. We circle about at the end of a fiord before the Taku Glacier, a huge wall of blue ice which rises from the water almost to the height of our national Capitol. From there we go on to Juneau, which is within gunshot of the Mendenhall Glacier, a river of ice several hundred feet deep, which ends in a valley bordered with the most gorgeous wild flowers. At the same time the breath of Jack Frost, whose summer home may be in this ice, sends a chill to our bones.

We shall see other glaciers as we fly northward along the coast, and about the Gulf of Alaska. There are more than five thousand between Ketchikan and Seward, near Prince William Sound, where the government railway begins. Upon the western slope of Mount St. Elias, for instance, eleven huge blocks of ice are moving down to the ocean, and one of these is fifty miles long and twenty miles wide, while another ends in a wall of ice two hundred feet high. The Muir Glacier, near Skagway, is twice as high as Niagara Falls and three times as wide.

We drop down at Juneau, the capital of Alaska, to call upon the governor of the territory and have a look at the great gold mines on Douglas Island and on the mainland near by. Juneau has good stores and fine homes running along streets of planks, which climb from the water far up the steep mountains.

We make another stop at beautiful Sitka, on Bara′nof Island not far away. This was the old capital, and it has buildings which were put up by the Russians when they owned the country. We learn here how the United States bought Alaska from Russia for seven million two hundred thousand dollars, and take our pencils and try to figure the cost. We find that the territory contains more than three hundred and seventy million acres, and that it cost less than two cents per acre. As we go on with our flight we shall learn what a good bargain Uncle Sam made with the Russians. The country now produces in gold, copper, and furs, every year, many times as much as it cost. From its mines we have already taken out gold, silver, and copper worth more than four hundred million dollars; from its waters we have sold fish products which have brought more than three hundred millions; and we have received more than eighty million dollars from the furs of the seals, otters, foxes, and other wild animals caught on both sea and land. Just now the chief mineral is copper, the product of which is worth more than the gold and silver combined; and from the fisheries we are annually receiving many million dollars more than from all the minerals.

When we remember that in the Louisiana Purchase we bought from France almost twice as much land as Alaska for about four cents an acre, it seems to us that Uncle Sam is a wise real estate dealer.

Flying on northwest, we skirt the Gulf of Alaska, going slowly over Cor′dova, where a railroad passes between two mighty glaciers on its way to the Kennecott copper mines high up in the mountains, and near which are large mines of copper and deposits of coal. A little later we drop down to the Kenai (kĕ-nī′) Peninsula to have a look at Seward, the southern terminus of the government railway. It is a thriving little settlement on an excellent harbor, kept open all the year round by the mild climate.

The distance from Seward to Fairbanks on the Tanana River in the heart of Alaska is about four hundred and seventy miles, and the government railroad now joins the two towns. This railroad runs northward through a little valley under the shadow of Mt. McKinley, the land about which is now a national park.

We have no time for a trip over the railway, but with our airplanes we fly to the top of the mountain, where we stop in order to say we have rested our feet on the highest point in the North American continent. The scenery is grand, but the air at this height is so thin that we find our heads aching with mountain sickness. The intense cold sends chills down our spines, and the winds almost lift our airplanes up from the ice. It is dangerous to wait, so we climb back into the planes and are soon out in the milder climate above the lowlands of the coast.

We sail high over Kodiak (kŏd-yăk′), a great green

Street in Nome during a Fourth of July celebration.

island noted for its huge bears; we see the volcano of Katmai sending up volumes of vapor off to our right; and then we go on out over the Aleutian Islands and above Bering Sea. Our next stop is in the midst of that sea, at the Pribilof′ Islands, where the fur seals come every year to breed and rear their young. It is from these seals that we get the beautiful furs that are sold all over the world. They have already brought in more than fifty million dollars, and the government protects the seals so that we shall probably have colonies of these animals here for all time to come. We spend a while with the government officers, taking photographs of the seals. Some of the huge bulls weigh five times as much as the biggest boy in our party, but the puppies are so small we can pull them about. They look like young dogs, and are so playful as they swim about in the water that we wish we could take one along with us.

From the seal islands our air fleet moves to the north. We pass the mouths of the Kuskokwim and Yukon rivers; fly slowly over Nome, where a few miners are washing out gold from the sands of the seashore, and then go on above Bering Strait into the Arctic Ocean. We follow the Arctic coast to Point Barrow, our settlement nearest the North Pole, and then come back to Nome.

Our flight has been made in the summer, when the Arctic Ocean is almost free from ice, although we now and then see an ice floe or a great iceberg floating about. There are schools of whales in the sea, and near the coast now and then we see a drove of walruses, huge sea animals, the largest of which is twelve feet in length and weighs almost a ton. Walruses spend most of their time near the shore, resting at times on the floating ice. They are valuable chiefly for their ivory tusks, one of which hangs downward on each side of their bristling mouths. Some of the tusks are almost as long as a baseball bat.

LX. ESKIMOS AND INDIANS — A TRIP UP THE YUKON

DURING our long flight through Alaska, we have seen many Indians. They live along the coast of the southern part of the territory, on the islands of the Alexander and Aleutian archipelagoes, and almost everywhere along the great rivers. Those of the interior live in log cabins, and in southeastern Alaska in houses of

Totem pole.

boards with huge totem poles wonderfully carved in front. The totem pole indicates the tribe or clan to which the family belongs, and it also had something to do with the religion of the Indians before they were converted to Christianity by our missionaries. There are Indian schools almost everywhere, and most of the Indians we meet speak more or less English.

Along the south coast the Indians live largely by fishing, and many of them work for the great fishing companies, both at sea and in the canneries. Some have boats of their own and go far out in the ocean for sea otters and halibut. In the interior nearly all hunt or trap for their living. Most of the furs and skins are taken in the winter and in the spring sold to the white traders who go from port to port and town to town to buy.

These Indians of Alaska are much like those of the United States, save that the waters are their chief hunting grounds. The food of some tribes is largely fish, wild game, and berries. They catch salmon in the summer and dry them for winter use. They have fish wheels similar to those we saw on the Columbia River, and as we fly up the Yukon or Kuskokwim, we shall see these fish wheels turning about in the stream, and racks of poles for drying the fish on the banks near by.

During our flight over the Seward Peninsula and along the coast of the Bering Sea and the Arctic Ocean we have seen many Eskimos. There are some here at Nome, and we can

Eskimo children. They wear fur-lined dresses and fur-lined boots.

fly to their little villages near by. The Eskimos about Nome make their living by fishing and hunting and selling furs and ivory carvings. They are dressed in half civilized fashion. The women have parkas, or long cloaks of calico trimmed with fur, and under them cloth trousers and boots of sealskin reaching halfway to their knees. Others of the Eskimos are clothed entirely in fur. They have fur parkas, fur trousers, and fur hats or bonnets which stand out in a long fringe around their light yellow faces.

The Eskimos are not so dark skinned as the Indians, and their faces are square rather than long. The children have rosy cheeks, and their lips are bright red. The faces of many of the old women are tattooed from the lower lip to the chin, and now and then we see an old man with a button of bone fastened in a hole near the edge of his mouth. The Eskimos have black eyes and coarse black hair. The women part their hair in the middle and wear it in two long braids down their backs. The eyes of the Eskimos slant a little like those of the Chinese. The people have a friendly look and smile as we trade with them.

Many of these people speak English, and their children go to the government schools. We have established more than twenty public schools on the Seward Peninsula and others along the north coast. More than eight hundred Eskimo children attend them. They are learning civilized ways and are taught to honor the American flag. The Eskimos learn their lessons as easily as we do, and they are experts in many games and athletic sports. They are good shots, and are skillful in handling the kayak (kī′ăk), a skin boat somewhat like a canoe.

Of late years many of the Eskimos have herds of reindeer, the descendants of animals which our government

Reindeer in Alaska. Once a year the herds are rounded up, and the young reindeer are marked to show who owns them.

brought from Siberia. They use the deer to drag their sledges from place to place. The milk and flesh of these animals are excellent food. We see large droves of reindeer during our flight, for there are now many thousands in Alaska, and they are increasing so fast that reindeer meat is being sent in cold storage ships to the United States to be sold in our markets. The meat tastes like venison. We wonder how our parents will like it when it comes to their tables.

During the winter some of the Eskimos live in snow houses near the good hunting and fishing grounds. The houses are made of blocks of snow, with tunnel-like entrances through which one has to crawl to reach the large room that forms the winter home. Instead of a window there is a hole in the walls or roof, which is sometimes covered with thin skin. The cooking was once done over lamps of stone in which seal or whale oil was burned, but now many of the Eskimos have oil stoves like ours and buy their kerosene from the traders.

Leaving Nome in our airplanes, we fly across Norton Sound to the mouth of the Yukon, and up that great river past the gold camp of Ruby to where the Tanana River flows into it at Fort Gibbon. Here we turn more to the south and fly up the Tanana valley to Fairbanks, the chief commercial center of interior Alaska. The town is situated at the end of the government railway whose other terminus we saw at Seward. It is also the head of navigation on the Tanana. There are steamers which make regular sailings out to the Yukon, some going down that river to Nome, and others upstream to Fort Yukon, Circle, Eagle, and on to Dawson in Canada. There are also trails and wagon roads from Fairbanks to Val′dez and Cordova on the south coast, and to mining camps in other parts of the territory. Fairbanks is in a rich placer mining region, and there are farms and gardens not far from the town. Our Department of Agriculture has an experiment station five miles from Fairbanks, where barley, buckwheat, and other grains are raised. The little city has large stores, a public library built of logs, and many comfortable log houses, which, in the summer, are surrounded by beautiful gardens of vegetables and flowers.

Farmhouse and summer flowers, near Fairbanks, Alaska.

1. Locate Alaska. The Alexander Archipelago. The Aleutian Islands. The Alaska Peninsula. The Seward Peninsula. Bering Strait. How far it is from Cape Prince of Wales to Asia? Where is Point Barrow?

2. Compare Alaska with the main body of the United States in size; in climate. Compare the Yukon River with the Columbia; with

the Mississippi; with the Hudson. Where is its source? its mouth? What navigable tributaries has it?

3. Locate Juneau, Sitka, Ketchikan, Seward, Nome, and Fairbanks, and tell something about each. Trace a shipment of goods from New York via railway to San Francisco, and by ship to Nome. By way of the Panama Canal to Seattle, and thence to Nome. By the Strait of Magellan.

4. From what nation did we buy Alaska? What was the price, and was it a profitable purchase?

5. What is the midnight sun? Where is it seen? (See Carpenter's "Europe.")

6. What is a glacier? Describe some glaciers which we see on our journey.

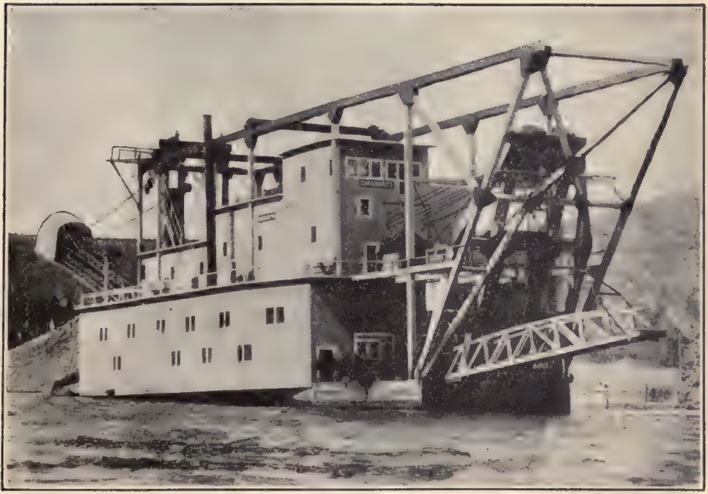
7. What are the chief products of Alaska? Pay a visit to the seal islands and tell what you see. (See also Carpenter's "How the World is Clothed," Chapter 26.)

8. Describe the Indians of Alaska. The Eskimos and their winter homes.

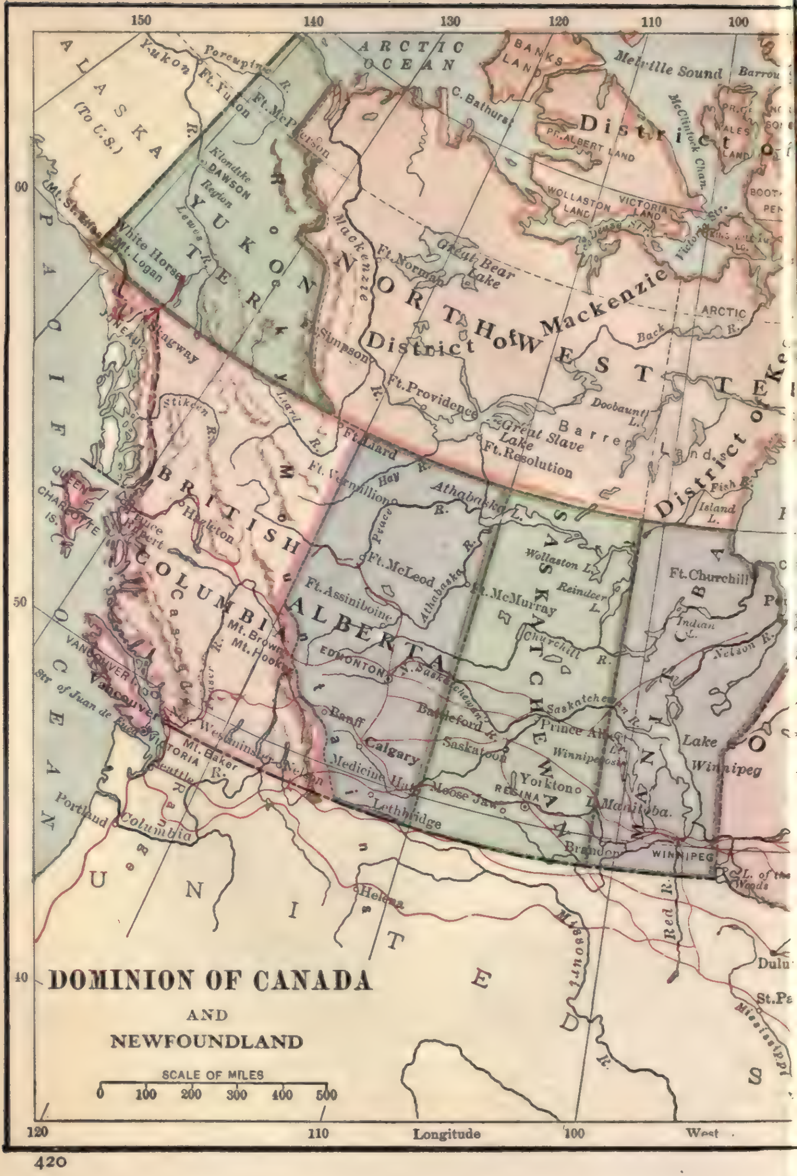
LXI. BRITISH AMERICA — GENERAL VIEW

WE have left Alaska and are now in British America. We have come by airplane from Fairbanks eastward to Dawson at the mouth of the Klondike where it flows into the Yukon. We are in what not very many years ago was one of the chief gold-mining regions of the world, and out of which even now men are taking every year gold worth some millions of dollars. The gold, like that about Fairbanks and Nome, is placer gold, most of which is buried deep down in earth that has been frozen for hundreds of years. The mining is done by thawing the soil by wood fires or steam pipes and washing it to get out the gold. In some places the thawed ground is worked over by huge dredges, and in others by hydraulic giants, or lines of large hose which send streams of water against the sides

Dawson, Yukon Territory.



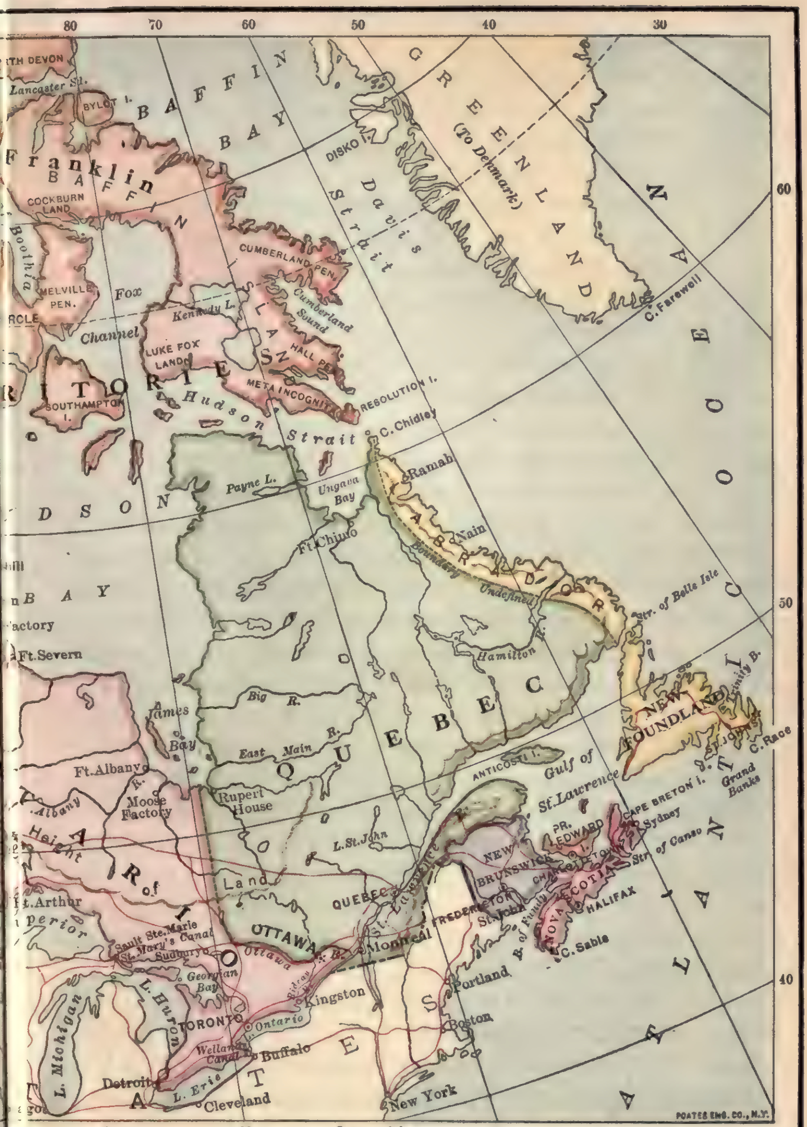
Gold dredge, Canada. It digs up the thawed ground and washes out the gold.



DOMINION OF CANADA

AND

NEWFOUNDLAND



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NORTH DEVON
Lancaster Sd.
BYLOT I.
BAFFIN BAY
Franklin
BAFFIN LAND
COCKBURN LAND
Boothia
MELVILLE PEN.
Fox Channel
CIRCLE
Kennedy L.
LUKE FOX LAND
TERRITORIES
SOUTHAMPTON I.
CUMBERLAND PEN.
Cumberland Sound
HALL PEN.
META INCOGNITA
RESOLUTION I.
DISKO I.
Davis Strait
GREENLAND (To Denmark)
C. Farewell
Hudson Strait
C. Chidley
Ramah
Ungava Bay
Payne L.
HUDSON BAY
Ft. Chimo
Nain
LABRADOR
Boundary Undefined
Hamilton
Str. of Belle Isle
NEWFOUNDLAND
Trinity B.
St. Johns
C. Race
Grand Banks
ATLANTIC OCEAN
Factory
Ft. Severn
James Bay
Big R.
East Main R.
QUEBEC
Ft. Albany
Albany
Moose Factory
Rupert House
Height of Land
ONTARIO
L. St. John
ANTICOSTI I.
Gulf of St. Lawrence
CAPE BRETON I.
Sydney
PR. EDWARD I.
CHARLOTTETOWN
Str. of Canso
NEW BRUNSWICK
FREDERICTON
St. John
NOVA SCOTIA
HALIFAX
B. of Fundy
C. Sable
QUEBEC
St. Lawrence R.
Ft. Arthur
Superior
Sault Ste. Marie
St. Mary's Canal
Sudbury
OTTAWA
Ottawa R.
Montreal
Georgian Bay
L. Huron
Rideau
Kingston
Portland
Boston
L. Michigan
TORONTO
Ontario
Welland Canal
Buffalo
UNITED STATES
Detroit
L. Erie
Cleveland
New York
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from
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Greenwich
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POATES ENG. CO., N.Y.

of the hills. It was in 1896 that the gold was discovered, and since then more than two hundred million dollars' worth of this precious metal has been taken out of the frozen ground.

The mines are now almost exhausted; and Dawson, which was once a fair-sized city, has dwindled to little more than a village. It is the capital of the Yukon Territory, however, and by a call on the governor we learn something of British America.

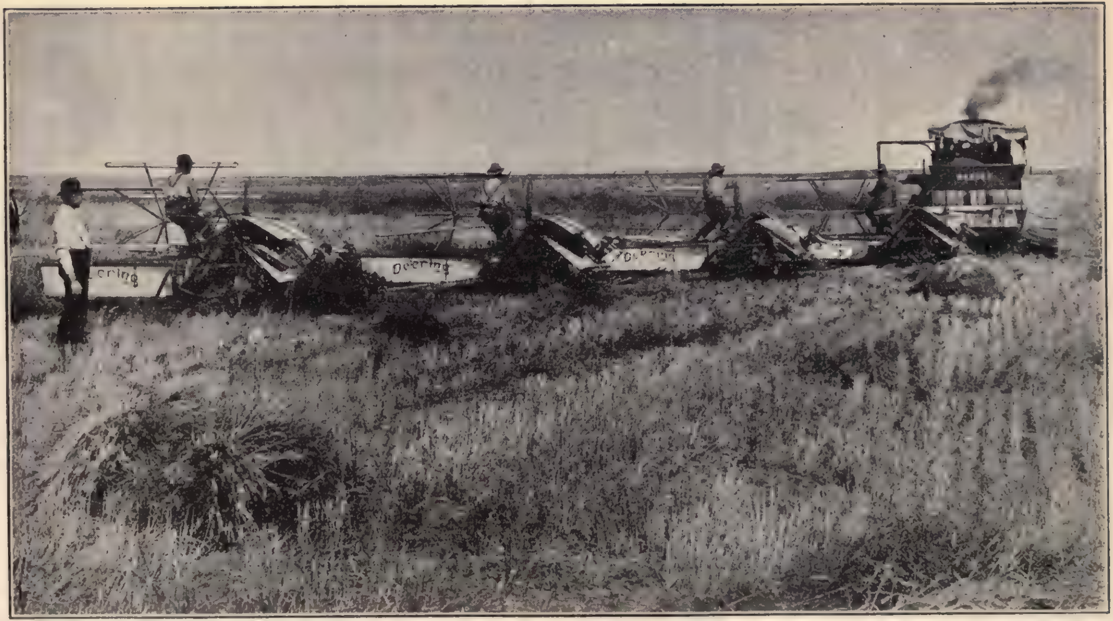
But first let us take a bird's-eye view of this mighty land to the north of the United States. British America is so large that we have not time to see it all, even by airplane. With the exception of Alaska, it includes the whole northern part of our continent. From north to south it is several hundred miles wider than the United States, and from east to west several hundred miles longer. It is almost as large as Europe, and has more land than our country, even including Alaska. Canada is larger than Australia, twice as large as India, and thirty times the size of the United Kingdom. The island of Newfoundland, which is not a part of the Dominion of Canada, is as large as Ohio. The Labrador coast is governed by Newfoundland.

This territory of British America is one of mighty mountains and vast plains and plateaus; of mighty rivers and inland seas. It has a western highland as we have, great plains devoted to wheat and other grains, and forests so extensive that only the wilds of northern Europe and Asia can be compared to them. The rivers of British America include the Mackenzie, which is about as long as the Mississippi without the Missouri, and the St. Lawrence, which drains the Great Lakes. Moreover, British America owns one half of four of those lakes, and it has also Great Bear Lake, which is larger than Lake Erie, and

Great Slave Lake and Lake Winnipeg, each of which exceeds Lake Ontario in size. Hudson Bay may be compared to the Mexican Gulf, for it is about thirteen hundred miles long and nearly six hundred miles wide. All together, the coast line of British America is half the length of the equator.

The climate of Canada varies from the mild coasts of British Columbia, where the winters are no colder than those of Kentucky, to the frigid lands of the north, where in the interior the thermometer may drop to seventy degrees below zero; and from regions where it rains almost every day to the dry lands east of the Rockies, where irrigation is required to make the crops grow. The far north has such long, cold winters that only a few Indians and Eskimos live there, though the short summers are very warm. The uninhabited lands of the whole country are so extensive that the population of Canada is less than one tenth that of the United States. The only thickly settled regions are in the provinces that border on the Great Lakes and in the grain areas of the great plains.

Nevertheless, British America is of enormous importance to us, and its resources are so many and so varied that it will always have a large place in the world. Its foreign trade is already more than two billion dollars a year, and the greater part of this is with the United States. The country has rich mines of gold, silver, and copper; it has enormous agricultural resources, and some of the largest fisheries of the world. The lumber and wood pulp exports of Canada amount to many millions of dollars a year, and a large part of the newspapers and books of the United States are printed on paper made from the soft-wood trees of the Canadian forests.



Reaping wheat in Saskatchewan, Canada. The four reapers are pulled by a tractor. They cut and bind the grain into sheaves.

But suppose we take a look at the map and divide the country into sections before we begin to explore it. In the far east we see Newfoundland, which is a separate colony of Great Britain; and southwest of it we see Prince Edward Island, New Brunswick, and Nova Scotia, belonging to Canada. This territory is almost surrounded by the sea, and, therefore, it is often referred to as the Maritime Provinces. It is about as large as Illinois and Ohio combined. It is a land of great resources, having valuable forests, and rich deposits of coal and other minerals. Its inhabitants are largely a sea-faring people, more than fifty thousand men being engaged in fishing for the cod, lobster, and herring found near its shores.

To the west of the Maritime Provinces are the two provinces of Quebec and Ontario, which are sometimes called Eastern Canada. This section of the Dominion has always been foremost in commerce, manufactures, farming, and forestry. It has the largest cities and almost two thirds of the people, and its area is about one third of all British America.

Farther west, between Ontario and British Columbia, lie the three prairie provinces of Manito'ba, Saskatchewan, and Alberta. These we call Central Canada. Their area is nearly equal to that of our plateau states, and they correspond somewhat in character with the great plains of our country. Most of the land is wooded, but the southern portion is one vast stretch of grain land and pastures.

West of the prairies and extending to the Pacific Ocean, is what is known as Western Canada, consisting for the most part of British Columbia. This corresponds to our Western Highlands. It has high mountains seamed with valuable minerals, and valleys which are being turned into orchards much like those of our Pacific Northwest.

British Columbia is almost one tenth the size of the United States.

The remainder of British America consists of Yukon Territory, where we are now, and the Northwest Territories. This is Northern Canada. It is one third as large as all Europe, but it is so wintry and wild that its population of Indians, Eskimos, and whites is less than fifty thousand all told. It might be called the great fur land of the Canadian Dominion.

LXII. NORTHERN CANADA — THE FUR LANDS — INDIANS AND ESKIMOS

TO-DAY we shall see something of the extensive wastes of British America. The land is so wild that we shall have to do most of our traveling by boats or canoes, or on foot with dog sleds. This part of the Canadian Dominion has few roads. There is only one little railway which comes over the mountains from Skagway, Alaska, to White Horse, at the head of navigation on the Yukon, where one can get steamers for Dawson. We take ship at Dawson and go on down the river to Fort Yukon, Alaska, where we steam up the Porcupine River to the Canadian boundary and then tramp across country to Fort McPherson on the Mackenzie. We carry some flour, bacon, and other food with us, and add to this by the fish and game we catch or shoot on the way.

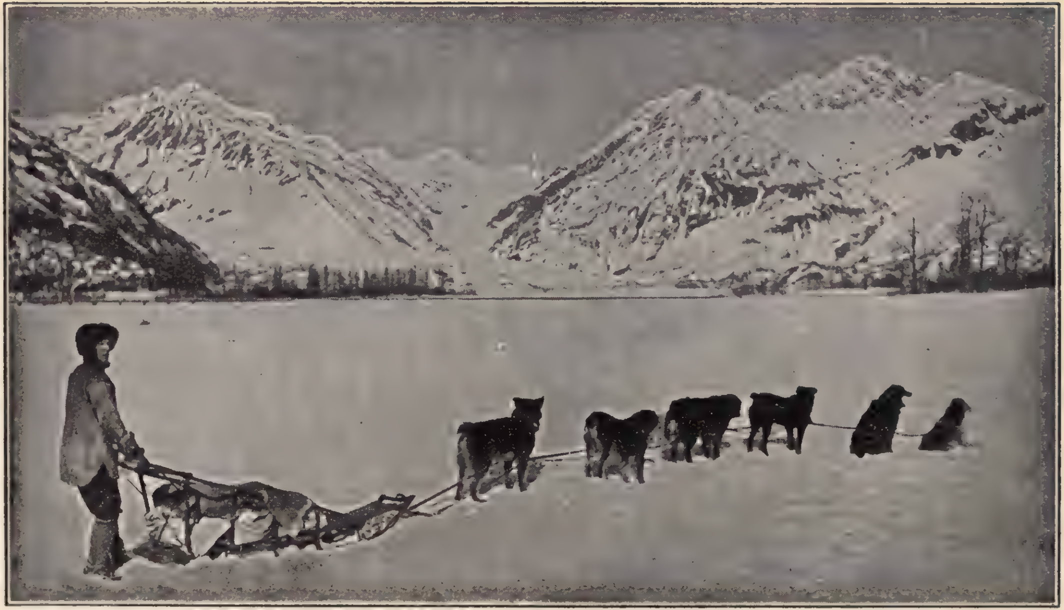
At Fort McPherson we find one of the Hudson Bay Company's steamers and go out to the Arctic Ocean to watch the whalers at work, and then, turning back, travel southward on the Mackenzie River to the Great Slave

Lake, from which we make our way across country to Hudson Bay. We visit the fur trading posts on the west coast of that bay, and from Port Nelson go to the end of the Hudson Bay railway, which takes us into the prairie provinces of Central Canada, and on to the more settled parts of the Canadian Dominion.

Our travels in the northland are especially interesting. With the exception of the treeless tundras along the Arctic Ocean, we are in the woods all the time, and the only people we see are the white fur traders and the half savage Indians and Eskimos who live by hunting and trapping. The traders are our hosts at the Hudson Bay Company posts where we stop on the way. Each post has a little store filled with goods, which are exchanged for the furs and skins that the Indians take in their trapping and hunting. We find Indians about the posts, and are able now and then to go out with them to look at their traps, or to hunt deer, bear, and other wild game.

The Hudson Bay Company controls most of the fur trade of British America. It was organized more than two hundred and fifty years ago, when Charles II of England gave certain rich citizens of London the exclusive right to trade with the Indians of the Hudson Bay wastes. This territory was extended until at last the company controlled nearly all the country from Labrador to the Pacific, and from the United States to the Arctic. Much of the southern part of these lands have since been taken over by settlers and turned into farms, but the Hudson Bay Company agents are to be found trading for furs almost everywhere in the northlands of the Canadian Dominion.

British America is one of the best fur lands of the world. It has bears, minks, foxes, wolves, and deer in its forests, and beavers and otters in its rivers and lakes. In the far



Dog sled and team of Eskimo dogs. This is the usual means of transportation in winter in northern Canada and Alaska.

north the trade is by barter, in which the unit of account is the beaver. One beaver pelt is worth a certain number of martens, and that of a silver fox is worth many beavers. The Hudson Bay Company sends out blankets, beads, knives, and other such things for sale, and the Indians know just how much they should get for each skin. Some of the supplies are brought in by railway and carried across southern Canada to Edmonton in Alberta and thence north to the Mackenzie River; some go to Dawson in the Yukon Territory and out that way; and some by steamers into Hudson Bay, which is open to navigation for about four months during the summer. The ships leave their supplies, and then return to London loaded with furs.

In our long northern journey we find no lack of either game or fish. We now and then kill a caribou and sometimes a moose. Moose hunting is by no means child's play. A bull moose is often eight feet in height, and from tip to tip its enormous antlers sometimes measure six feet. The best time for hunting moose is in winter. Then the tracks of the huge animals can be plainly seen in the deep snow, and by using snowshoes one can follow them so rapidly that they cannot escape. The Indians call the moose by imitating its cries, and they are careful to keep to the windward lest he should scent their presence. In such hunting it is well to have a repeating rifle; for the huge bulls are fierce fighters, and when wounded are liable to turn upon the hunter and crush him with their horns.

In the Rockies of British America are many panthers, grizzly bears, and mountain sheep, and in the north are polar bears, such as we have in Alaska. The grizzlies are enormous, and those who hunt them take their lives in their hands. Mountain sheep are found in the hills high above where the grizzlies live. They are sure-footed, jumping from rock to rock, and are difficult to kill.

1. Locate British America. Compare it in size and climate with the United States. With Europe. With the United Kingdom. Into what sections may British America be divided? Locate them on the map, and name their chief characteristics.

2. What is the population of British America? How does it compare with that of the United States? (See page 492.)

3. Locate Northern Canada. Hudson Bay. Mackenzie River.

4. What is the Hudson Bay Company? How is the fur trading carried on? What are the principal furs from northern North America? Which are the most important? How are they caught and prepared for the markets? (See Carpenter's "How the World is Clothed," pages 176-205.)

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LXIII. WESTERN AND CENTRAL CANADA — ACROSS THE ROCKIES AND WHEAT BELT INTO ONTARIO

FROM the southern terminus of the Hudson Bay railway we travel westward through Saskatchewan and Alberta to Edmonton, and thence by the Grand Trunk Pacific railway over the Rocky Mountains to Prince Rupert. The scenery of the last part of the trip is quite as wonderful as anything we have seen in the United States, and there are snow-clad mountains most of the way. Prince Rupert lies right on the sea. It is one of the chief ports of Western Canada, and salmon and halibut are brought here by shiploads and frozen for export over the railways to Eastern Canada and the United States.

Prince Rupert has an excellent harbor, from which some day there will probably be many steamship lines going to and from Japan and China. The port is so far north on the globe that its distance from these countries across the Pacific Ocean is much less than from Puget Sound or San Francisco, and by this route the trip from Europe westward to Asia can be reduced one or two days. At present most of the shipping of British America goes to the Far East and Australia through the port of Vancouver (vӑn-kōō′ver). We shall visit that next.

We take ship at Prince Rupert and steam southward along the coast, and within two days are at anchor in the harbor of a delightful city in sight of the great white cone of Mount Baker, which we have already seen from Seattle. This is Vancouver, the western terminus of the Canadian Pacific railway, and an important port for steamers going to Asia. The city has wide streets, beautiful parks, and many fine buildings.

Not far from Vancouver, at the southern end of the island of Vancouver and on the route of the steamships going out to the Pacific, is Victoria, the capital of British Columbia. This in another fine city, with great public buildings looking out on the harbor, and with comfortable homes, which, with their many flowers, remind us of Seattle, Tacoma, and Portland. Vancouver Island is almost as large as Ireland. It has a delightful climate and much rich farming land.

We leave Vancouver for our trip east by the Canadian Pacific, going along the Fraser (frā′zer) River, where the miners are still washing gold from the sands, and then climbing onward and upward into the heart of the Rockies.

The scenery is grand in the Canadian Rockies. We ride for days with snow-capped mountains in sight, now and then flying past glaciers and great fields of ice, and now looking down into valleys walled with huge pines and great Douglas firs. There are mining camps here and there on the way,

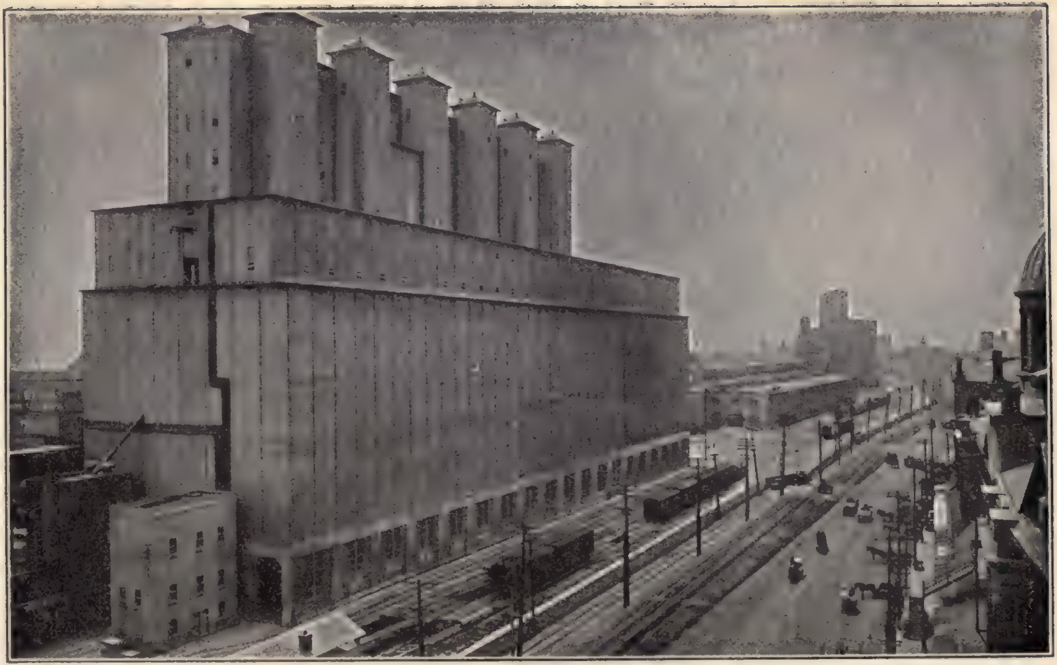
Mount Assiniboine, near Banff, Canada. This peak is known as the "Matterhorn of America."

and if we should go off from the railroad we might find settlements where men are mining gold, silver, copper, and coal, or visit valleys where are great orchards of apples and pears.

British Columbia has some of the richest mining regions of the North American continent, and its mineral output is worth millions of dollars a year. It may be compared with the Western Highland of our country, although the climate near the coast is milder than that of the highlands of the United States.

Out of the Rockies we come down into the great plains of Central Canada, stopping first at Cal′gary, whose location reminds us of Denver. Like Denver, it is in the foothills of the mountains, and like that city it is surrounded by vast tracts of irrigated lands, watered by a river which comes from the highlands. Going on eastward, we travel for days through the wheat fields, crossing Alberta, Saskatchewan, and Manitoba, all large provinces with rich farming lands. There are many cities and towns with elevators near the railroad, where we see the farmers unloading their grain for the cars. We are now in the largest block of wheat land in the world and we might travel for hundreds of miles to the north, south, east, or west and not get out of the grain fields. We stay awhile at Regi′na, the capital of Saskatchewan, and spend several days in Winnipeg, the capital of Manitoba, and the largest city of this part of Canada. It is the metropolis of the Canadian wheat lands; all the Canadian trunk lines from the Atlantic to the Pacific pass through it; and it soon will have railway connections also with Hudson Bay. It is the key to the prairies and commands the trade of the region to the north and west.

Leaving Winnipeg by train, we stop next at Port Arthur, on Lake Superior. This place corresponds to Duluth, in our own country, as it is the Canadian head of the navigation of the Great Lakes. It is a thriving milling and manufacturing center, and has so many huge elevators that it might be called the Minneapolis of British America. Here we spend some time watching the loading and unloading of wheat, and are told that most of the grain put on the steamers will be sent down through the St. Marys



Wheat elevator at Fort William, near Port Arthur, on Lake Superior..

Canal and the Welland Canal to Montreal (mŏnt-rē-ôl′), and thence off to Europe. Indeed, we might go along with the wheat and stay on the boat until we reach Montreal, but we have made a similar journey by ship from Duluth to Buffalo, and as we want to see the interior of the country we decide to continue our travels by railway.

The first part of our journey is through dense timber lands. Almost all of the southern part of the province of Ontario, in which we are now, is covered with forest, and the only farms are those which have been cut out of the woods. We travel for miles seeing nothing but trees, crossing rapid rivers and skirting numerous lakes.

We stop over a day at Sudbury to see the greatest nickel mines of the world.

Every one of us knows what a nickel five-cent piece is. How would you like to have a pile of them as big as the National Capitol at Washington? If you had, it would not contain as much nickel as the ore that already has been taken out of the mines here at Sudbury. There are only two places on earth, so far as is known, where nickel is found in large quantities. One is here in Canada, and the other is on the little island of New Caledonia, south of the equator and not far from Australia. Canada produces about three fourths of all that is mined.

The nickel ore at Sudbury lies in the earth much like the iron ore we saw at Lake Superior, except that the nickel is sandwiched between great walls of rock. The ore is taken out by drilling and blasting, and the metal is smelted and refined for the various industries or to be coined into money. One of its uses is for hardening the steel of projectiles and of armor plate for vessels of war. It is also employed to toughen steel railroad rails when used on curves or steep grades. A great amount of nickel is also consumed in nickel plating, for a thin coating of it will keep iron or steel from rusting away.

1. Locate Prince Rupert and Vancouver. Why is Prince Rupert nearer Asia than Vancouver?
2. Take a trip across Western and Central Canada from Vancouver to Winnipeg and tell what you see. Through what provinces do you pass? What is the chief crop of this region east of the Rockies? Compare it with the same crop of the United States. Of other countries (See page 501.)
3. From what port on Lake Superior are the products of Central Canada sent down the lakes to Montreal? Through what two canals do they go? What share has Canada in the Great Lakes? What lake belongs entirely to the United States?
4. What is nickel, and where is it found? Bring a nickel five-cent piece to class and let it tell its story.

LXIV. EASTERN CANADA — OTTAWA, MONTREAL, AND TORONTO

TRAVELING on to the eastward, we come into the more thickly settled regions of Ontario, and finally, at about thirteen hundred miles from Winnipeg, reach Ot′tawa, the capital of the Canadian Dominion. Ottawa is a beautiful city. It is situated on a high bluff at the junction of the Rideau (rē-dō′) and Ottawa rivers. The rivers pass through the city, and the immense water power is utilized for foundries and factories. One can go by steamer on the Ottawa River to Montreal, and on the Rideau Canal to Lake Ontario at Kingston.

The streets of Ottawa are wide and laid out at right angles. The chief government buildings are on Parliament Hill, which is one hundred and twenty-five feet above the river. The magnificent Parliament Building is more than five hundred feet long.

It is at Ottawa that the governor-general of Canada lives. He is appointed by the king of Great Britain, and receives a salary of about fifty thousand dollars a year. He is little more than a figurehead, however, like the king. The people of Canada elect the members of the Dominion Parliament, and it is Parliament that fixes the taxes and directs how all of the government moneys are to be spent. Parliament makes the laws, and controls the prime minister, who is the real chief executive.

The Parliament at Ottawa deals only with Canada as a whole. Each of the provinces has a government somewhat like that of our states. Although nominally a colony of Great Britain, the country is almost as much a republic as ours is.

The two largest cities of Canada are Montreal and Toronto. Toronto is the capital of the province of Ontario. It is situated on the north shore of Lake Ontario, on an inlet which gives it a magnificent harbor, Canada's three transcontinental railways have terminals at Toronto, and this is also the chief port for the vessels that go through the Welland Canal on their way up and down the Great Lakes. The city is of about the same size as Buffalo, and like Buffalo it draws much of its light, heat, and power from Niagara Falls. It is a beautiful city, and is a large railway, commercial, and manufacturing center.

Montreal is three hundred and thirty-three miles from Toronto. It might be called the New York of Canada, for it is the chief seaport and chief commercial and financial center. The city is situated on an island formed by the junction of the Ottawa and St. Lawrence rivers. It is more than six hundred miles inland from the Atlantic

Ocean, by the St. Lawrence River, but the largest seagoing vessels can come to Montreal. This gives Canada an ocean port far in the interior.

In Montreal, we take taxicabs and ride down to the wharves which line the St. Lawrence for more than a mile. Huge ocean steamers are coming in and going out, and we see immense cargoes of grain which have been brought down from Port Arthur through the Welland Canal being transferred to other vessels for Europe.

Leaving the river, we drive through the city to the foot of Mount Royal, the hill from which Montreal was named. It is about three hundred feet high, and we ride to the top on an inclined railway like those on Pikes Peak and Mount Washington. The view is magnificent. To the south and southwest we can see our own green Adirondacks with their peaks kissing the sky. Below us lies the city, its wide streets bordered by trees, with its great churches, its huge skyscrapers, and its many factories and grain elevators. The wide, silvery St. Lawrence flows before us, and we notice the Victoria Bridge, an openwork steel structure, with double tracks, carriage ways, and walks for pedestrians. It rests upon piers or pillars of stone, the upper sides of which extend out into the river in the shape of great plowshares in order to cut the ice when it rushes against them in the spring.

Winter in Canada is the jolliest time of the year. The air is cold and dry and the snow lies upon the ground for months. There are skating, snowshoeing, and tobogganing. Every city has its skating rink and every town its snowshoe club, each member of which has his own uniform consisting of a bright-colored blanket coat with a hood or cowl on it fastened to the neck so that it may be drawn up over the head. The children run over the snow, playing games in the moonlight. They sing as they play, and the sight is a pretty one.

Tobogganing is enjoyed by men, women, and children. The toboggan is a thin piece of board about eighteen inches wide and from four to eight feet long. The board is turned up at the front end. It has a smooth bottom, and when placed on the edge of a hill with one or more passengers seated upon it, it will rush down over the glassy snow with the speed of an express train. The steersman sits in the rear, directing the course of the board with his foot. If he makes a mistake the toboggan with all upon it may be turned upside down in the snow.

Toboggan slide in Quebec. The city is built partly beside the river and partly on the hill above it. The toboggans fly down the hill for a half mile or more.

LXV. QUEBEC — THE MARITIME PROVINCES

IN our travels through Eastern Canada we find that many of the people are French. In the province and city of Quebec most of the inhabitants are of French descent. French is spoken by almost everyone on the streets of Montreal, and at the government offices we find that all official notices are printed in both English and French. The signs over the stores are in the two languages, and most of the newspapers are printed in French. The market is supplied with vegetables by French-Canadian farmers, and the talk there makes one think of the markets of Paris.

For a long time this part of Canada was a possession of France, and it was a question whether the French or the British would control the Great Lakes and the northern part of the continent. In 1759, during the French and Indian War, the British soldiers under General Wolfe climbed the heights upon which the city of Quebec is built and captured it. The British conquered the country, and in 1763 Canada was formally annexed to the British Empire. It is still a dependency of Great Britain, although, as we have seen, its people practically govern themselves.

As we steam down the St. Lawrence from Montreal, we are interested in the stories we hear of the fight at Quebec, and we stop there to have a look at the city, and stroll about over the battlefield. The town is so well fortified by nature that it has been called the American Gibraltar. It is built partly upon a rocky bluff three hundred feet above the water, and there are forts on the rocks near the city, and also on the heights on the opposite bank, so that it would be almost impossible for a foreign battleship to pass through and go on up the St. Lawrence River.

Scene in Quebec. The city has many narrow streets and old-fashioned houses.

The battlefield of the French and the British was the Plains of Abraham, just back of Quebec. As we stand upon it our guides tell us that both of the commanding generals were mortally wounded during the engagement. General Wolfe, the leader of the British forces, died on the field, having been hit three times. General Montcalm′, who led the French, was struck twice, and was carried into Quebec, where at five o'clock next morning he died. This battle was fought September 13, 1759. Soon afterwards the French rule in North America came to an end.

Quebec is much like an old town of France. It has narrow streets which wind their way up and down hill, and as we go through them we can hardly believe that we are on the hustling, bustling North American continent. One ot the modes of conveyance is by the calash′, a one-horse vehicle with two wheels and a body that rests upon springs on the shafts. We hire calashes and ride through the lower town, visiting the market, and then climb the hills to have a look at the public buildings, convents, and churches. We stroll upon Dufferin Terrace, on the edge of the cliffs several hundred feet above the St. Lawrence, and then go out to the citadel to watch the drill of the soldiers.

Our next trip takes us into the Maritime Provinces We go to Nova Scotia, visit New Brunswick, and stop awhile in Prince Edward Island to see the farms on which foxes are raised for their furs. We then cross over into Newfoundland, and go with a fishing schooner out to the Grand Banks to the greatest cod-fishing grounds of the world. Here under the shallow sea is a plain about two hundred miles long and seventy miles wide, where codfish, herring, and mackerel come by millions to feed. These fish are fond of cold water, and the Arctic current, which flows over the banks, brings down the slime containing the sea life that forms their favorite food. The cod are the most important. They are caught in quantities and sent all over the world.

Most of the time the Banks are covered with fogs, and as huge icebergs sometimes float over them, and the steamers on their way to and from Europe cross them, the fishing is dangerous. The Grand Banks are free to the fishermen of all the world, and vessels from our country and other lands compete with those of Canada in catching fish.

The air is pure and the fresh breezes from the Atlantic, flavored with salt, fill us with a desire to be again on the sea. There are steamers at the wharves and we have no trouble in finding one to carry us southward to Boston. From there we go by rail to New York and take passage upon a ship for Vera Cruz (vā′rä kro͞os′), the chief seaport of Mexico.

1. Pay a visit to Ottawa and the Parliament Building. Compare the government of Canada with that of the United States.

2. Locate Toronto, and compare it with a great United States city near by. By what water power are many of its factories run? Describe this power, and tell why Canada has more of it than the United States. (See page 279.)

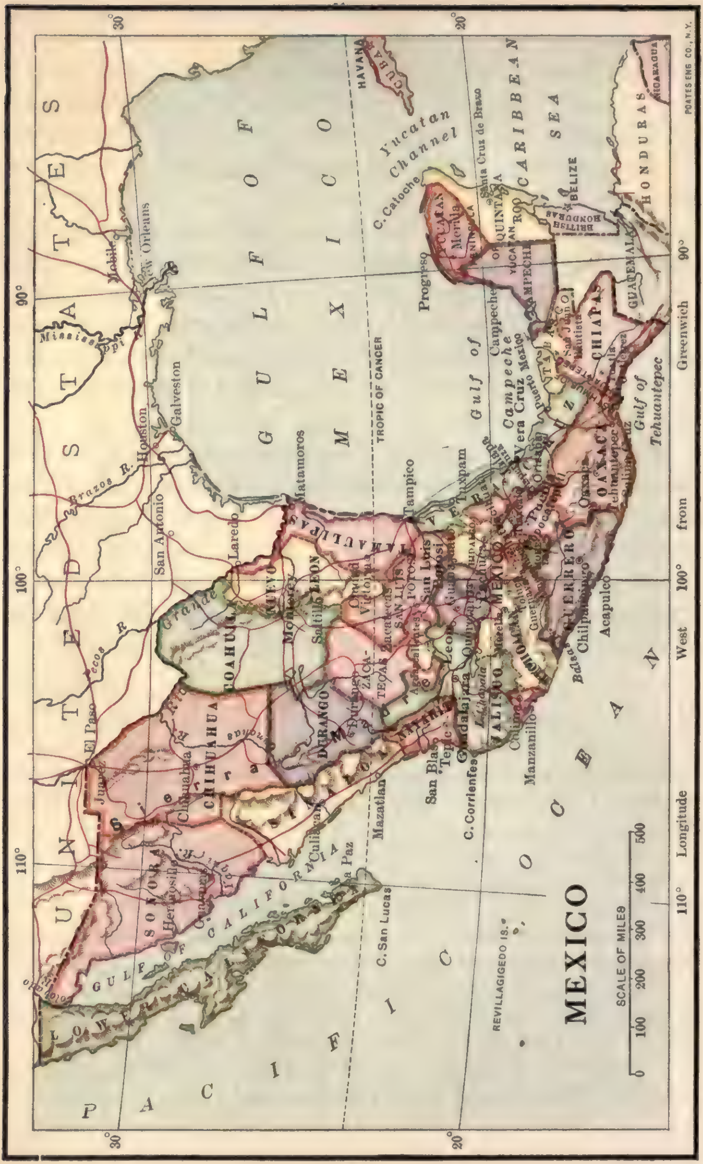
3. Why might Montreal be called the New York of Canada? Describe the advantages of its location.

4. During what season would you like to visit Canada? Why?

5. Where is Quebec? Why does it have so many French people? What great battle took place there? How is the city defended?

6. What great fishing grounds are found in eastern Canada? What is the principal fish caught there for the markets? How is the fishing done? (See Carpenter's "How the World is Fed," page 157.)

7. Find New Caledonia on the map and describe it. (See Carpenter's "Australia and Islands of the Seas.")


MEXICO
UNITED STATES
GULF OF MEXICO
PACIFIC OCEAN
CARIBBEAN SEA
GULF OF CALIFORNIA
LOWER CALIFORNIA
Gulf of Campeche
Gulf of Tehuantepec
Yucatan Channel
TROPIC OF CANCER
SONORA
CHIHUAHUA
COAHUILA
NUEVO LEON
TAMAULIPAS
SINALOA
DURANGO
ZACATECAS
SAN LUIS POTOSI
NAYARIT
JALISCO
COLIMA
MICHOACAN
GUERRERO
OAXACA
CHIAPAS
TABASCO
CAMPECHE
YUCATAN
QUINTANA ROO
VERA CRUZ
BRITISH HONDURAS
HONDURAS
GUATEMALA
NICARAGUA
CUBA
HAVANA
BELIZE
El Paso
San Antonio
Houston
Galveston
New Orleans
Mobile
Laredo
Matamoros
Monterey
Saltillo
Tampico
Tuxpam
Vera Cruz
Puebla
Orizaba
Oaxaca
Acapulco
Mazatlan
Culiacan
Hermosillo
Guaymas
La Paz
C. San Lucas
San Blas
Tepic
Guadalajara
Manzanillo
Colima
Merida
Progreso
Campeche
C. Catoche
Santa Cruz de Bravo
REVILLAGIGEDO IS.
Rio Grande
Pecos R.
Brazos R.
Mississippi
SCALE OF MILES
0 100 200 300 400 500
Longitude 110° West 100° from Greenwich 90°
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20°
POATES ENG. CO., N.Y.

LXVI. MEXICO — GENERAL VIEW

WE are in Mexico this morning. We have jumped from the north temperate zone into the tropics. As we sailed southward from New York, the weather grew warmer and warmer. We soon entered the Gulf Stream, and made our way against the current until we passed through Florida Strait and crossed the Gulf of Mexico. We sailed over the Gulf not far north of the Peninsula of Yucatan (yo͞o-kä-tän′) and came to anchor inside the breakwater at the piers of Vera Cruz. We are now in the hot lands of our sister republic. There are palm trees and tropical plants in the gardens, and outside the city are plantations of bananas and sugar cane. We see orange and lemon trees everywhere, and there are many coconut palms on the coast.

Let us take a bird's-eye view of this new land before we explore it. Mexico does not look large on the map, but it is one fifth the size of British America. Where the country joins the United States, the distance across it is almost as great as from New York to Denver; and from El Paso in Texas to Merida (mā′rē-thä) in Yucatan, by land, the distance is much greater. The coastline of Mexico on the Gulf of Mexico and Pacific Ocean is so long that if joined end to end it would reach from San Francisco to London with some miles to spare.

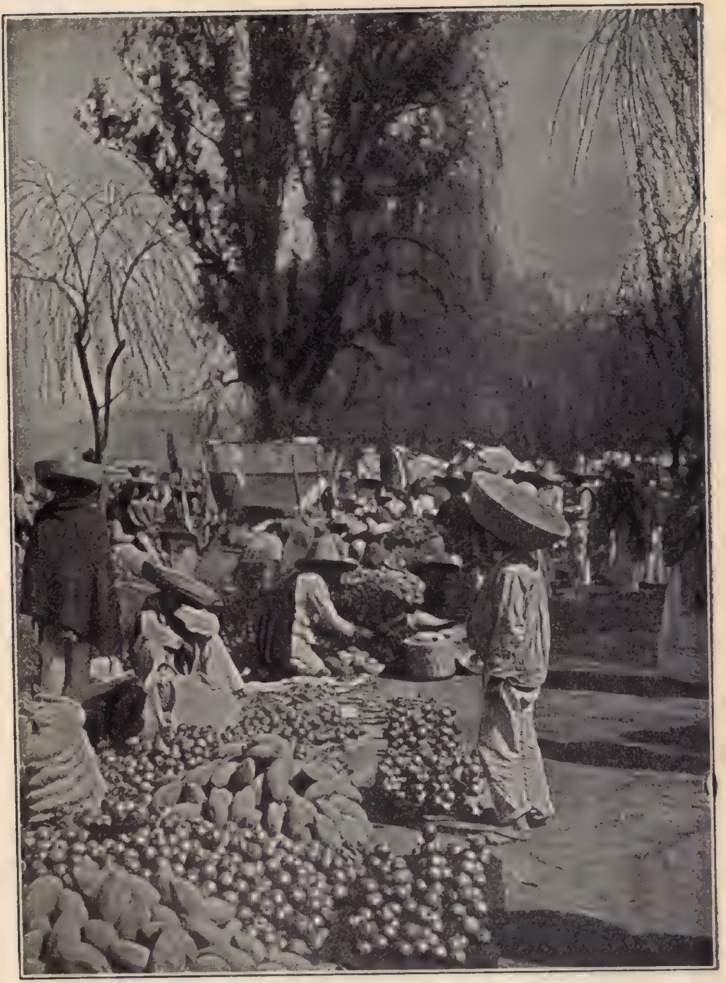
And now how does Mexico look as it is spread out before us? Is it not like a great horn with its roots in the United States boundary and its tip in the Yucatan Channel? The land is low along the coast of the Gulf of Mexico and the Pacific Ocean; and from there it rises steeply to the top of the great highland of mountains and plateaus which runs through western North America from Panama to far-off

Alaska. In Mexico this highland is a wide plateau with many high mountains rising above it. On the average it is more than a mile above the sea, so that it has the most delightful of climates.

It is only in the lowlands of Mexico that the weather is tropical. We have already found out that altitude has quite as much to do with the climate of a place as its nearness to the equator. As we climb the hills from the coast, we soon come into the temperate regions, or *terra templada* (tyĕr′rä tĕm-plä′thä) as the Mexicans call it, and should we ascend to the top of the mountains we should reach the *tierra fria* (frē′ä), or cold land, parts of which are covered with ice the year round. The hot lands of the coast are known as the *tierra caliente* (kä-lyĕn′tĕ).

A great part of our traveling will be done upon the plateau, for that region contains most of the land and has a temperate climate so that most of the people live there. We shall find the weather there much like that of our June all the year round. There is no winter, but a wet and a dry season, neither of which is unpleasant. If we are at Mexico city during the wet season, we shall be safe in going out without our umbrellas until about two o'clock p. m., and after that we can move about between showers until nightfall, when the sky will be clear again.

The different altitudes of Mexico give all sorts of crops. Sugar, cotton, and cacao grow well along the coast, and there we find bananas, pineapples, and vanilla beans. A little higher up are orchards of cacao, and of lemons and oranges, and also coffee plantations. The plateau is largely a desert covered with sage brush and cactus. It has many irrigated farms which produce much the same crops as our central states. It has corn, wheat, and other grains, and beans are grown almost everywhere. Corn



A roadside market in Mexico, for vegetables and fruits of the temperate as well as the torrid zone. Notice the men's hats with brims a foot wide.

and beans form a large part of the food of the people. Much of the plateau is divided into great ranches, and cattle and sheep in great numbers graze upon the high plains.

Mexico is a land of rich mines. It produces more than one fourth of all the silver of the world. It has also large deposits of gold, lead, copper, and zinc. It has one silver mine, the Veta Madre (vā′tä mä′drâ) Lode at Guanajuato (gwä-nä-hwä′tō), which has produced almost as much silver as the famous Comstock mine we saw on our Western Highland.

But what sort of people has Mexico? We can see types of the different kinds here in Vera Cruz, but we should have to travel over the whole country to appreciate them and know what they do. Mexico has over fifteen million inhabitants. It has more people than all British America, and about one seventh as many as we have in the United States. Only about one fifth of the people are pure whites, the descendants of the Spaniards who conquered the country shortly after it was discovered. The remainder are either pure Indians, or the descendants of whites and Indians. There are more than five million pure Indians in Mexico, which is about twenty times as many as we have in our country. The Mexican Indians, however, have always been more civilized than most of the red race north of the Rio Grande, and to-day they live almost altogether by farming or labor of one kind or another. The language of the people is Spanish, which is spoken by most of the Indians as well as by the whites.

As we go over Mexico we shall find that a large part of the country is cultivated. The good lands are divided up into farms, and there are many cities and towns with factories and other industrial establishments. There are several long trunk lines of railway which connect the country with the United States. Many of the cities and towns are lighted by electricity. Most of the country is civilized, although within the past few years there have been many revolutions against the government, and on this account the people have not advanced as they should.

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LXVII. FROM VERA CRUZ TO MEXICO CITY

LANDING at Vera Cruz, we seem to be in another world. The faces of the people are darker than ours. We cannot speak Spanish, and must have a guide who understands English to take us about. Many of the ladies we see on the streets are clad all in black; and some have lace shawls over their heads like those worn by the women of Spain. Some of the men from the country wear hats with brims a foot wide, and bands of silver and gold as thick as our thumbs. They have jackets embroidered with silver, leather belts from which silver-mounted revolvers hang, and trousers ornamented with stripes of silver buttons.

We take motor cars and ride through the streets. The roofs are flat and we see very few chimneys. Almost all over Mexico the people use charcoal for cooking, and here at Vera Cruz it is so hot one does not need a fire to keep warm.

How gay the town is! The walls of the houses are painted in bright reds, yellows, and blues. The houses stand on the edge of the sidewalks, and the windows of the ground floor have iron bars like those of a prison. There is a great square or plaza in the center of the town, and about this are many fine buildings.

Going out into the country, we ride for miles by groves of palm trees, in the tops of which hang coconuts. We pass thickets of bamboo cane, whose feathery branches extend high above the roofs of the cars. We see here and there a mahogany or an ebony tree, and our guide points out the vines which he says bear the vanilla bean. It is from these beans that we get the extract used in flavoring ice cream and cake. When we take a vanilla soda we are drinking something from Mexico.

The forests are interesting. They are full of curious flowers, and there are so many orchids and other rare plants hanging to the trunks and the branches, that we could have a carload for the picking. There are birds of bright colors flying about through the trees, and the mocking birds whistle at us as we go by.

Coming back to Vera Cruz, we take the train for Mexico city. We cross the lowlands and find the ascent to the plateau so steep that a double locomotive is used. In one place we rise a thousand feet in twenty miles, and in another four thousand feet in twenty-nine miles. The great engine drags us on through tunnel after tunnel, now twisting this way and now winding that, until at last, having lifted us more than a mile and a half above the sea, it lands us at Esperanza (ĕs-pâ-rän′sä), where we stop for lunch.

We are now at the beginning of the plateau which forms the greater part of Mexico. During our climb we have gone through a half dozen different climates. Just outside Vera Cruz we passed through fields of pineapples, the pink bodies of which shone out against the dark earth. At one of the stations, some Indian women brought the fruit to the cars. It was fresher and riper than any sold in our markets and much more delicious than any we had ever tasted before. It was so soft that we ate it with spoons. A little farther on we passed through a banana plantation, with coffee bushes under the shade of the bananas. The bushes have dark green leaves and bright red berries as big around as a small chestnut. There were Indians picking the berries and we were told that each berry contains two of the seeds which form the coffee of commerce.

Coffee plants are sprouted in nurseries, and then set out in fields, and well cultivated. At the age of four or five years, they begin to produce fruit and continue to yield for many years. Each bush gives from one to five pounds of coffee a year. After the berries are gathered, they are crushed to get off the soft pulpy hulls, and the seeds or beans are then dried and cleaned for the market. Almost all of our coffee comes from Brazil, but Mexico raises fine coffee, and we see large plantations along the railway about Orizaba (ō-rê-sä′bä) on our way from the sea to the plateau.

Going on with our journey, we soon reach a country which reminds us of our Western Highland. The land is white and glaring, and for miles the only plants are cactus and sagebrush. As we ride through on the railroads, our eyes grow sore and our nostrils are filled with the dust of the desert. There are many varieties of cactus. Some of us have seen century plants in our hothouses at home. Mexico has a species of this plant family, which is of great value on account of the long threads or fibers of which its leaves are composed. It is henequen (hĕn′ĕ-kĕn), or Sisal hemp, which is of great value for the making of binder twine and ropes of all kinds. Much of our wheat,

Maguey plants, and donkeys carrying pigskins of native beer toward Mexico city.

oats, and other grain is bound up with twine made of the fibers. The Sisal hemp plant grows best in Yucatan. We buy one hundred and fifty thousand tons of this fiber in one year.

Another cactus which we see on our way to Mexico city supplies a beer of which the Mexicans are fond. This plant is the maguey (măg′wā), which grows so big that one plant could hardly be crowded into a hogshead. The maguey has leaves from six to eight inches thick, which sprout up from the ground to the height of ten or twelve feet, and in some cases as high as twenty feet. Inside the leaves lies a green cone as big around as a peck measure, and when this cone is cut out, a hole about the size of a two-gallon bowl is left.

Into this bowl the sap or juice from the leaves runs down in streams, a single plant producing several gallons a day. At first the juice is sweet, and milky in color. Within a short time it turns darker and begins to ferment, and soon becomes a beer that will make one drunk if one takes too much of it. The sap continues to flow for months, so that a single plant may produce several barrels of the liquor.

1. Locate Mexico. Trace our route from New York to Vera Cruz. Through what waters do we go? How far do we travel? At fifteen miles per hour, how long is the voyage?

2. Compare Mexico in size and population with British America. With the United States.

3. What classes of people make up the present population? Compare the Mexican Indians with those of the United States. What is the language of Mexico? Why?

4. Describe the climate and the vegetation of the lowlands of Mexico. Of the plateau. Where are the banana and pineapple fields? The coffee plantations? What is coffee and how is it grown? (For further information see Carpenter's "How the World is Fed," pages 297-308, also Carpenter's "South America," pages 293-301.)

5. Name five minerals of Mexico. How does Mexico rank in the world in the production of silver?

6. Visit Vera Cruz and tell what you see.

7. What is henequen? Where does it grow best? Why are our farmers interested in it? Trace a shipment to Minneapolis via New York. What is maguey, and how is it used?

LXVIII. THE CAPITAL OF MEXICO

WE are in Mexico city this morning. We arrived here last night, having come two hundred and sixty-three miles by rail from Vera Cruz on the coast. We are now in the heart of the plateau, about halfway between the Gulf of Mexico and the Pacific Ocean. We are almost a mile and a half above the sea, in the highest of the great capitals of the world. Lassa in Tibet, Quito (kē′tō) in Ecuador, and Bogota′ in Colombia, are the only capitals which are higher, but all are small in comparison.

Mexico is the largest city of North America outside the United States. It is a magnificent city, lying amid lakes in a beautiful and almost circular valley, upon which look down some of the highest peaks of the North American continent. One is Popocatepetl (pô-pō′kä-tā′pĕt'l), from whose icy summit are now rising volcanic vapors, and another is Ixtaccihuatl (ēs-täk-sē′hwät'l), or the White Woman, so named because its top has the form of a sleeping giantess clad in perpetual snow.

Taking a taxi, we go to the huge cathedral which stands in the center of the city. We can climb one of its towers and have a bird's-eye view of the Mexican capital. Now we have entered the tower and felt our way round and round through the darkness up the steps to the top. Where we come out we are two hundred feet above the plaza, with a great expanse of red and gray buildings spread out all about us. Beyond, on all sides, stretching far away to the foot of the mountains, is a beautiful valley forty-five miles long and thirty miles wide, with a half dozen silvery lakes scattered here and there through it.

The Mexican capital is a fair type of many of the cities of Mexico, and this view gives us some idea also of the smaller towns of the country. As the city shines out below us it looks much like a checkerboard. The streets cross one another at right angles, and they go out in every direction from the great square in which the cathedral stands. The roofs of the houses are flat, and, strange to say, there are no chimneys rising above them. Not a bit of smoke comes from any of the buildings, for the fuel is charcoal, which makes no smoke, and the cooking is done in little clay ovens. There are but few furnaces, and iron kitchen stoves are almost unknown.

From the roofs of some of the houses we can see white and gay-colored patches floating to and fro in the breeze. They are the family washings, which are often dried on the roofs. Farther out in the suburbs, upon the edges of the canals, are other patches of white. They belong to the laundresses. Much of the washing of Mexico is done in the streams, only cold water being used to get the clothes clean.

Observe how the houses are built. Very few of them are of more than three stories in height, but some cover a great deal of ground. They stand close to the sidewalks, and consist of a wall of rooms built around a little court or *patio* (pät′yō). Every large Mexican house has a court of this kind, usually with flowers and trees growing in it, and in many patios there is a fountain.

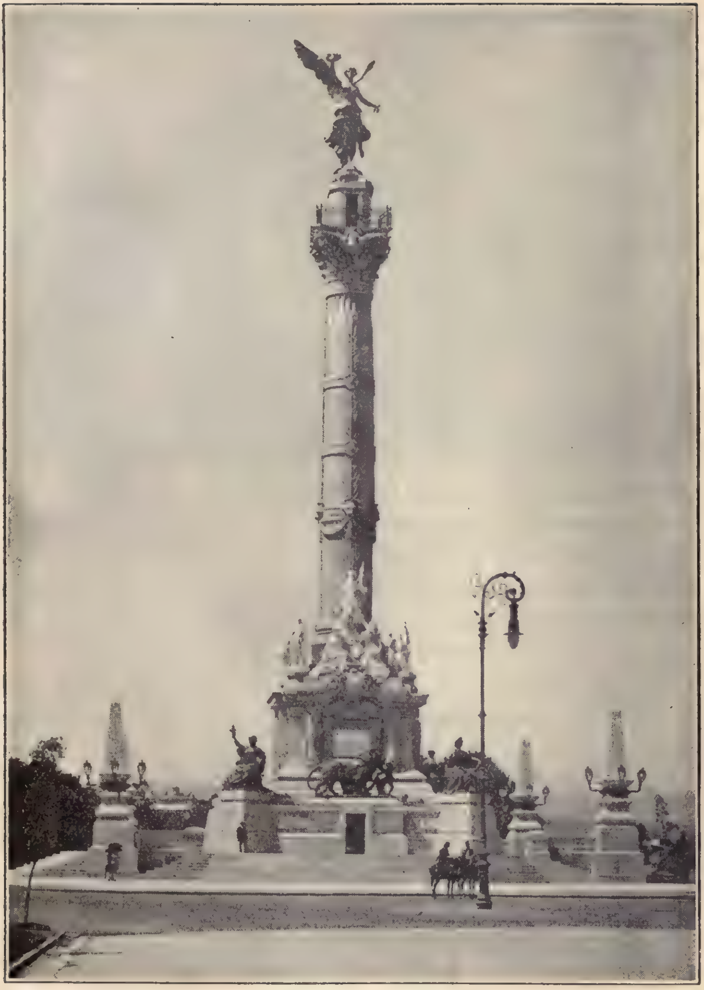
The big square below us is called the plaza. There every evening a band plays, and the people come to stroll about under the trees to visit together and chat. Such a plaza is to be found in every Mexican city. The people are fond of music and they spend much time out of doors.

A little beyond the plaza we can see the business section of the city. The streets are wide and faced with fine stores. Here and there a fine public building rises high above the other structures, and we see many large theaters and churches and schools. Mexico city is lighted by electricity furnished by water power not far away. It has several thousand arc lights, and at night the streets are like day. There are trolley cars everywhere, and thousands of automobiles and motor trucks.

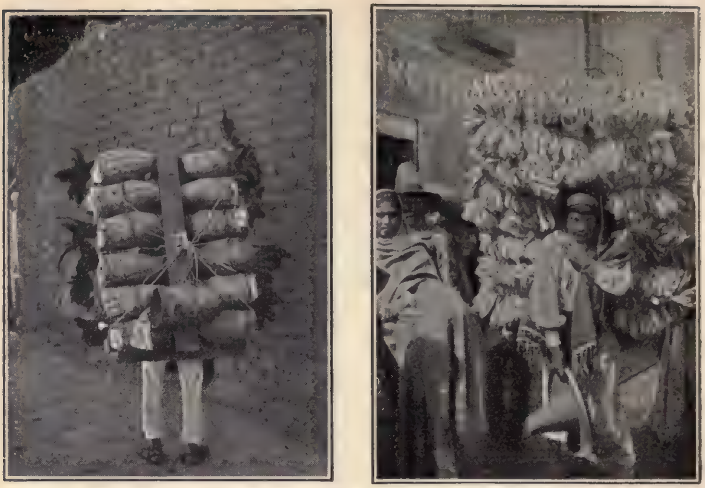
That long three-story building at the side of the plaza just below us is the national palace, where the Congress of Mexico sits, and where some of the officers of the government work. Mexico is a republic. It has a president and a congress. There are twenty-eight states, two territories, and a federal district. It is in the national palace that the president has his offices, and in the same building also sit some of the cabinet officers.

But let us go down from the cathedral and take a walk through the city. It is now high noon, and the streets are almost deserted. Everything closes here at midday. The Mexicans have their dinner between twelve and one, and after that they have a nap and a chat with their families before they go back to work. The business hours are from nine to twelve in the morning and from three to six in the afternoon.

By seven o'clock most of the establishments are closed, and the evening is given up to rest or to pleasure. The poorer people go to the parks, and the richer drive out in their carriages and motor cars upon the Paseo de la Reforma (pä-sā′ō dâ lä râ-fōr′mä), past the great monument to Mexico's independence. The concert halls and the theaters are alive with light, and nearly all the people seem to be enjoying themselves. Among the favorite amusements is bullfighting. This takes place in the bull-ring, where men upon horseback and on foot enrage a wild bull and kill him as he rushes at them and tries to gore them



Independence Monument, Mexico, on the Paseo de la Reforma, the finest avenue of the city. It is built of granite and Italian marble, and cost twice as much as our Washington Monument.



Street peddlers in Mexico. The game cocks are put into the baskets head first so that they cannot peck each other. The cornhusks are sold to market-men for use as wrapping paper.

with his horns. Many thousands of men and women go to see these fights, but the sport is cruel and would not be permitted in the United States.

During our stay in the city we go out shopping and spend some time in the markets. The signs over the stores do not tell us what is sold within. A barber shop may be called La Perla, or "The Pearl," and a candy store may have a sign that means "The White Cat." One glove store is known as "The Violets," and a grocery has over its front door "The Pearl of the Occident." We are interested in the places where hats are sold. The headgear is of all sorts, from caps and hats such as we wear to sombreros (sŏm-brā′rōz), great hats as big around as a bicycle wheel, loaded with silver and gold and embroidery, and with bands of gold braid around the crown.

As we go along the streets we meet many peddlers. One of the strangest is a man selling game cocks, which he carries about on his back. Each cock is kept in a basket so arranged that only his tail can be seen. These birds like to fight one another, and if they could reach their heads out they would surely be pecking at every rooster near by.

Other strange peddlers we meet are boys driving turkeys which they sell, as it were, on the hoof. There are also men going about with loads of dried corn husks on their backs. These are sold to the merchants, who use them as wrapping paper. Some kinds of cooked food, such as hot tamales (tā-mä′lĕz), are always wrapped up in corn husks.

The markets of Mexico are excellent. They are to be found in every street and town. Many of them have all the fruits of the torrid and temperate zones. Here in Mexico city we can buy a pineapple as big as our heads for a few cents, and a half dozen juicy oranges for a nickel.

LXIX. THE AZTECS AND THE INDIANS OF TO-DAY

ONE of the most interesting places in Mexico city is the National Museum. It has many relics of the Aztecs, the Indians who inhabited the country at the time it was conquered by the Spaniards under Hernando Cor′tes. The Aztecs had their capital where Mexico city now is. They were much more civilized than our Indians. Many of them had comfortable homes, and the king had great palaces beautifully furnished.

The Aztecs used picture writing instead of letters as we do. They made dyes, and were expert workers in metal. When Cortes landed he was given presents of vessels of gold, silver, and copper, and among them were silver plates as big around as a bicycle wheel.

Cortes landed at Vera Cruz and sank his ships to show his soldiers they must conquer or die. He then made his way up to the plateau, fighting now and then with the Indians, and at last, in November, 1519, he came to the capital. He made the Emperor Montezuma a prisoner, and after some terrible battles he was able to bring Mexico under Spanish rule. Spanish governors remained in control for about three hundred years, when the Mexicans rose against Spain and decided to rule the country themselves. They declared their independence, and formed a government of their own, which, with many revolutions and changes, has existed from that time to this. The government is now a republic somewhat like our own. The history of Mexico is interesting, and we decide to study it when we go home.

The Spaniards practically enslaved the Indians, and many of the descendants of the ancient Aztecs and other tribes are little more than slaves to-day. The laws have been such that their employers have been able to keep them in debt, and for this reason they have been forced to work for very low wages, and kept pitiably poor.

Of late years there have been many movements in Mexico to better these conditions, and it is hoped that the time will come when the large estates will be divided so that the poorer people can more easily have farms and homes of their own. Already there are schools in all the cities and towns, and also in many of the villages. Nevertheless, a large proportion of the Mexicans can neither read nor write, and their condition is by no means as good as it should be.

We see many Indians in Mexico city, and we shall see them everywhere as we travel over the country. The men dress in white cotton shirts and trousers, with their shirts outside their trousers. They do not wear stockings. Their feet are shod with sandals of leather, and they have broad-brimmed hats with crowns a foot high. Some of them have a red blanket which they throw about their shoulders. The women are usually barefooted and bareheaded. They wear dresses of white cotton, and often a shawl which is drawn over their heads and draped about their shoulders.

The homes of the Indians are usually huts of mud or stone, but in the low wooded country they are made of sticks tied together and roofed with straw thatch.

The farming in many parts of the country is very crude. The plow is often little more than a short stick, and it is only on the large estates that modern farm machinery is used.

Indian corn is the chief food of the poorer Mexicans. Many of them do not know what bread is, and hundreds of thousands have never tasted wheat flour. The women often grind their own corn. We can see them outside their huts kneeling down before a rough slab of stone about a foot wide and eighteen inches in length. The grains of corn, having been soaked in lime water until they are soft, are laid upon this slab, and the women roll a round stone over them, mashing them into a paste or dough. This dough is formed by hand into a thick cake and is cooked upon a charcoal fire. So made it is known as a tortilla (tŏr-tēl′yä). It is eaten with butter, and sometimes seasoned with salt and red pepper. We taste one. It is not at all bad.

There is one dish that is well served in every house here. This is black beans, or, in the Mexican language, frijoles (frē-hō′lās). It is not an uncommon thing to have frijoles at the close of a meal. The Mexicans make fine candies, and delicious chocolate is sold everywhere.

LXX. WE CLIMB POPOCATEPETL — A VISIT TO THE OIL FIELDS

DURING our stay in Mexico city we go out by railroad to the town of Amecameca (ä-mā-kä-mā′kä), at the foot of Popocatepetl. We have decided to climb the mighty volcano, and find Indian guides at the station as we come from the train. They give us long staffs shod with iron to keep us from falling, and carry ropes with them to help us over the ice and snow.

For the first few hours our way is through a pine forest. We then climb hills of volcanic rock, wading at times through loose, shifting black sand. It grows cooler as we rise, and the trees become smaller until at last we reach a region above which nothing grows, and pass over the line where from year's end to year's end the ice never melts. Just below this the snow is soft, but higher up it grows harder and harder. The air is colder and thinner. How our hearts beat! If we go too fast we feel faint and shaky. The glare of the sun on the snow dazzles our eyes, and our hands are torn from pulling ourselves from point to point over the ice. At last we reach the top and stand on the edge of the crater of one of the greatest volcanoes of North America.

Popocatepetl is not now throwing stones, rock, and lava into the air. It is not in violent action, but it is always vomiting fumes of sulphur, and we have to get to the windward of the yellow brimstone vapor which rises out of the great hole in the top of the mountain before we dare look down within.

The crater is almost a mile wide at the top, and more then one thousand feet deep. The walls slope inward, and peeping over we see scores of Indians gathering the

Crater Lake, Popocatepetl. The timbers are connected with a hoist over a bluff 200 feet high, for use in mining sulphur in the crater.

sulphur in bags and carrying it on ladders up to the top. From there it is slid down the mountain in a sort of a chute. The process of mining seems terribly hard in comparison with the way we saw sulphur taken out of the ground by machinery at Freeport in Texas.

Leaving the Mexican capital, we go by railroad to different parts of the country, visiting the principal cities and spending some time on the great haciendas (ä-syĕn′däs) where one may ride on horseback all day and not come to the end of a field or farm. We spend much time in the mountains exploring the mines of gold, silver, and copper, and near Durango (do͞o-räng′gō) in the northern part of the plateau, we see a mountain of iron ore, now being used in making steel.

We are delighted with Oaxaca (wä-hä′kä), a thriving town a little more than a day's ride by train south of Mexico city, and with Guadalajara (gwä-t͟hä-lȧ-hä′rä), a beautiful city not far from the Pacific coast. We go by railroad northward over the plateau to the great silver-mining towns of Guanajuato, Zacatecas (sä-kä-tä′käs), and Chihuahua (chê-wä′wä), stopping on the way to visit the quarries where men are taking opals out of the rocks. We each buy one of these beautiful stones for less than a dollar.

We visit also the towns of Monterey (mŏn-tĕ-rā′) and San Luis Potosi (sän-lo͞o-ēs′pō-tô-sē′) on the Mexican national railway, and from the latter go over a branch line to the port of Tampico (täm-pē′kō), on the Mexican border. San Luis Potosi is the largest city of Mexico outside the capital, and Tampico is one of the chief oil ports of the world.

The scenes near Tampico remind us of those we saw during our travels in Texas. There are huge oil tanks

Oil wells and storage tanks in Mexico.

outside the city, and in the country about is a forest of derricks, each standing above an oil well. Mexico is one of the most important oil countries of the world. For hundreds of miles along the Gulf of Mexico, running from Tampico almost to Vera Cruz, and in places still farther south, are great deposits of petroleum which have produced many, many million barrels of oil. The output in 1919 alone was more than eighty million barrels, and at times the wells of the republic have yielded more than one million barrels in one day.

Some of the largest oil wells of the world have been discovered in this region. One near Tampico, when the petroleum was struck, sent forth a stream of oil that rose to the height of four hundred feet and continued to pour forth petroleum at the rate of several thousand barrels an hour for three months before it could be controlled. The oil filled the air like a great mist. It covered the rivers and lakes for miles about, and thousands of cattle died of thirst because they would not drink the waters coated with petroleum. Some of the oil flowed out to the sea, and there was a greasy scum on the Gulf for several hundred miles along the coast.

We find many oil refineries about Tampico, and in the harbor we see tank steamers taking on fuel oil, kerosene, and gasoline for shipment abroad. A great deal of the product goes to our country, much to Europe, and some to Panama and the ports of South America, Australia, and Asia.

1. Locate Mexico city. Compare it with others of the world's loftiest capitals. Describe some of its features, especially the buildings and streets. Contrast the midday scenes of an American city with those of a Mexican city. Take a ride through the Mexican capital and tell what you see.

2. Locate Mt. Popocatepetl and describe our trip there. Compare the process of mining sulphur in Mexico with that we saw at Freeport, Texas. What is a volcano? Name a famous volcano of Italy. Of Alaska. Of the Hawaiian Islands.

3. What is the government of Mexico? Tell something about the history of Mexico. Who was Cortes? Montezuma? Who were the Aztecs? Describe the Indians of to-day.

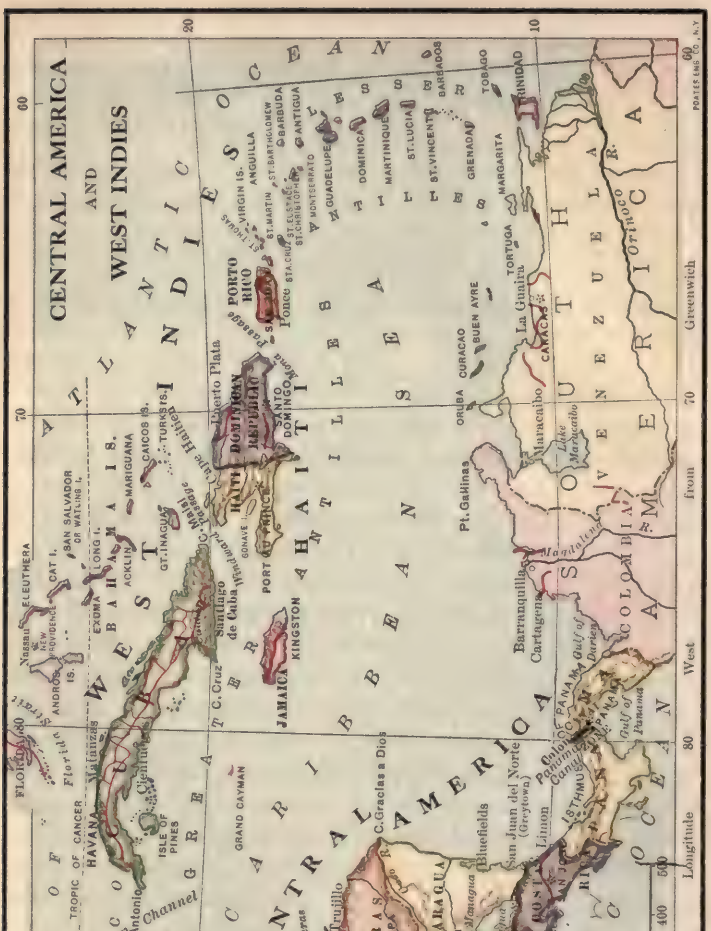
4. Where are the oil fields of Mexico? What is the chief oil port? How is the oil shipped to other countries?

5. Locate the chief cities of Mexico, and tell something for which each is noted.

LXXI. CENTRAL AMERICA — GENERAL VIEW

FROM Tampico we steam along the coast to Vera Cruz, and thence go south by railway through Mexico to the Isthmus of Tehuantepec (tâ-wän-tâ-pĕk′). Here the width of North America is only a little over one hundred and twenty miles and the land is so low that it was once proposed to build a ship railway from coast to coast and transport great steamers from one ocean to the other upon it. It is doubtful whether this could have been done, and it is not necessary now that we have built the Panama Canal. There is, however, an ordinary railroad across Tehuantepec, and good ports on each side. It is only one hundred and fifty miles long, and some of the traffic between the Atlantic and Pacific is carried that way. The port on the Gulf side is Puerto Mexico and that on the Pacific side is Salina Cruz (sä-lē′nä kro͞os). This is the shortest railway across our continent except the one at Panama along the line of the canal.

Through the southern part of the isthmus is the uncompleted Intercontinental Railway, which it is hoped some


CENTRAL AMERICA AND WEST INDIES

day may form a continuous line through North and South America. When it is completed one may be able to go from Alaska to the Strait of Magellan by train. At present the northern part of the line stops in Guatemala (gwä-tȧ-mä′-la), although many other parts of it are built farther south.

We get on the cars and are soon across the border in one of the republics of Central America.

Central America seems to be a small part of our continent as we look at the map. It is not large as compared with all North America, but it has so much land that if it were patched together and dropped down in the United States it would more than cover Ohio, Indiana, Kentucky, and Tennessee. The country is like Mexico in that it has lowlands along the coasts, with highlands and mountains between. The lowlands are tropical, but the highlands are temperate, and there we find most of the large cities and most of the people.

Central America is a land of republics. With the exception of British Hondu′ras, which is a dependency of Great Britain, it is made up of six independent governments, modeled somewhat on the plan of the United States. Each country has its own president and congress elected by the people, and each is divided into states.

The republics are not very small. Guatemala at the north and Nicara′gua have each about the same area as New York; Honduras is larger than Tennessee; and Panama is as big as South Carolina. Costa Rica (kŏs′ta rē′ka) is equal to four states as large as Connecticut, and Salvador (säl-vȧ-dōr′) is the size of Maryland.

Most of Central America is rich in resources. Its mountains have gold, silver, and copper, and on their slopes are plantations of coffee and cacao, and orchards of oranges and lemons. Coconuts and pineapples grow in the lowlands, and near the Gulf of Mexico are some of the richest banana lands of the world. We visit one of the banana plantations farther on in our travels.

Schoolboys of Central America. The Spanish words on the slate mean "new art."

Everywhere we go in our travels in Central America we meet many Indians. They remind us of the Indians we saw in Mexico. They do most of the work of the country. We see them on the coffee and sugar plantations, we buy of them in the markets, and often pass them in the roadways, carrying great loads on their backs.

The population of Central America consists of the whites, the descendants of the Spaniards; the Mestizos (mĕs-tē′-zōz), the descendants of Spaniards who intermarried with the Indians; and the pure Indians. By law all classes of people have equal rights, and everyone is supposed to vote and to have a part in the government. All the republics have free schools, and the people are advancing in civilization and wealth.

LXXII. A TRIP THROUGH GUATEMALA

ENTERING the republic of Guatemala, we ride for many miles through the forests. The trees are tropical. We see many tall palms, some of which have great bunches of coconuts at the roots of the long leaves that sprout out from their trunks forty or fifty feet from the ground. We see rubber trees, and the trees that yield the chicle from which we get chewing gum. Now and then we pass a great mahogany, and there are other hardwood trees of large size, the names of which we do not know. Everywhere the forest is dense. The huge trees are bound together with vines, and thousands of beautiful orchids and other airplants hang from their branches. There are many bright-colored birds, and now and then a monkey gibbers at us out of the leaves.

We are especially interested in the mahogany trees. Central America is one of the lands of mahogany, and much of our finest furniture is from the wood of these forests. Logs from the west coast are shipped south to the Panama

Canal and thence to our Atlantic ports. Those of the east coast, where the best forests are, go by ship to New Orleans or New York and from there to our chief furniture-making centers.

During our trip through the country we watch men getting the mahogany out for the market. The lumbering is not done as in our country. There is no snow, and much of the wood is too heavy to float. The mahogany trees do not grow close together, but at long distances apart. The mahogany hunters climb the highest trees of the forest, and pick out the mahoganies by their bright-colored leaves. The trees grow to a great height, and not a few rise sixty feet above the ground before the branches begin. Some are so large that five men joining arms cannot reach around one of them. No trees are cut which are less than eight feet in circumference, and the men tell us a mahogany tree must be three centuries old before it is ready for lumber.

In some places we see men tapping rubber trees. They cut out strips of bark the whole length of the trunk, and the latex, or rubber juice, which at first looks like milk, runs down into a bowl made at the roots. It makes us think of the turpentine farms we saw in our southern states. After the latex has been collected it is hardened by smoke into cakes for the market.

Going on east through Guatemala, we soon reach the Central Railway, which takes us up to the plateau. We pass through orchards of cacao trees, from which we get chocolate, and plantations of coffee, which continue all the way to the highlands. The country is mountainous. We are in sight of volcanoes all the way up, and at Lake Amatitlan (ä-mä-tē̂-tlän′) the two mighty volcanoes of Agua (ä′gwä) and Fuego (fwā′gō), or Water and Fire, look down upon us.

Picking coffee. Each ripe coffee berry is about the size and appearance of a cherry. The coffee we buy is the seeds in the berries.

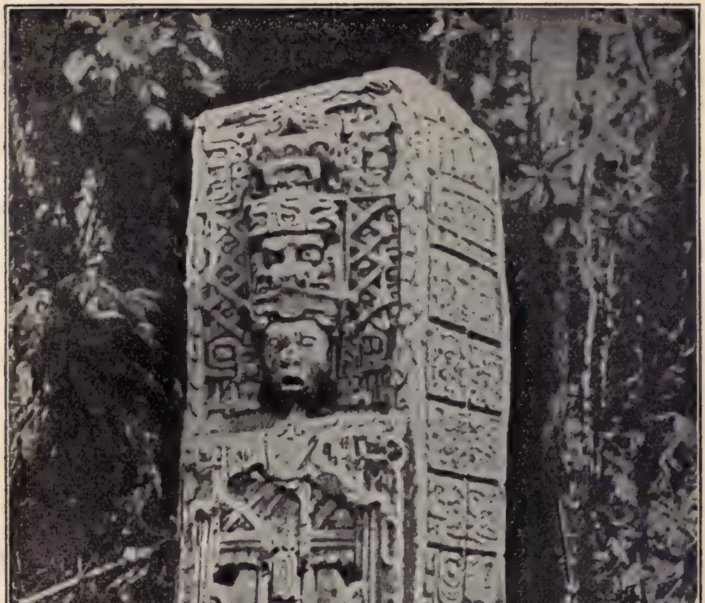
Continuing our trip, we are soon in Gautemala city, the capital of the country. It is one of the largest cities of Central America, although it has now less than one hundred thousand population. It is surrounded by volcanoes, and only a few years ago it had a terrible earthquake which destroyed many buildings and killed some of the people.

Indeed, Guatemala city has always had to fight for its life with volcanoes. It was first located on the slope of Mount Agua, and earthquakes and the eruptions of that mountain destroyed it again and again, until the people moved the city about thirty miles distant to where it is now. That was about one hundred and fifty years ago, and the people thought they were safe until the last great earthquake occurred.

To-day many of the structures destroyed then have been rebuilt, and no one would imagine that the city was one of the oldest towns of our hemisphere. The first capital of Guatemala was for a long time the chief Spanish city south of Mexico. It was a center of education, business, and culture before we had cities of any size in the United States. It had a cathedral and colleges when the boys of the Puritan Fathers were driving the cows along the paths which afterwards formed the streets of old Boston.

We spend a short time in Guatemala city. It reminds us of the Mexican capital, and it is a fair type of the capitals of the Central American republics. The houses are built low on account of the earthquakes, and some of them cover a great deal of ground. They consist of tiers of buildings running around courts or patios in which sometimes are gardens and fountains. They are painted in the brightest of colors, and their red tiled roofs shine out under the clear sun of the plateau.

The city has many good school buildings, and when we



One of the stone monuments erected by the ancient Mayas at Quirigua, Guatemala. The Mayas made records of dates and events by picture writing on monuments like this.

visit them the children come out and go through a drill carrying American and Guatemalan flags in our honor. They sometimes meet us with flags at the stations, and seem glad to welcome us to Central America.

Leaving Guatemala city by train, we ride across the plateau and down the mountains to Puerto Barrios (pwĕr′-tō bär-rē′ōs), passing through the ruins of Quirigua (kē̍-rē′gwä), which five hundred or a thousand years ago was one of the greatest cities of the ancient Ma′yas, a nation of Central American Indians. Some of its ruined temples have been cut out of the jungles, and the great stone monuments, covered with carvings which are still to be seen (page 475), show us that these people must have had a civilization much the same as that of the Aztecs of Mexico.

LXXIII. THE BANANA INDUSTRY — FROM PUERTO BARRIOS TO BALBOA

WE ride through great banana plantations in the lowlands of Guatemala on our way to Puerto Barrios, and we see bananas growing in other lowlands as we move down the coast of Honduras and Nicaragua to Limon (lē̍-mōn′) in Costa Rica. There are tens of thousands of acres of bananas not far from Limon, and other great tracts devoted to this fruit in the northern part of the republic of Panama. Indeed, Central America might be called Banana Land, for it produces more bananas than any other part of the world. Most of the bananas sold in the United States come from here. The principal plantations belong to one of our great fruit companies, which has steamers that sail weekly from New Orleans, New York, Boston, and other ports for Central America and come back loaded with bananas. A single ship will carry many thousands of bunches. It brings its cargo to our ports, and the bananas are unloaded by the aid of machines, and put in cold storage cars to be shipped by the carload and sometimes the trainload to different parts of the United States. The bananas sold in the stores near our homes probably came from Central America.

Cutting bananas. The fruit grows in huge bunches. It is cut green and ripens on its way to market.

During our stay at Limon we go by railway out through the plantations, and ride for miles seeing nothing but bananas on both sides of the track. The wide leaves brush against the car windows, and we can see the great bunches of green fruit hanging down from the tall stems on which they grow. All of the bananas are green, and we look in vain to find any ripe yellow fruit. The fruit is cut green, and allowed to ripen on its long trip to the markets. A single plant produces but one bunch of fruit, and a single bunch may have one hundred and fifty bananas upon it. So when we learn that the United States eats sixty million bunches of bananas every year, we get some idea of what an enormous business this is.

From Limon we go by railroad to San José (sän-hō-sā′), the fine little capital of Costa Rica, situated upon the plateau about midway between the two oceans, and thence make our way down over the mountains to the port of Punta Arenas (pōōn′tä ä-rā′näs) on the Pacific. From there we sail north to Nicaragua, and take a train to Mana′gua, the capital, not far from Lake Nicaragua. Through this lake a canal was once planned to cross Central America, but was given up when the Panama Canal was constructed.

The route for this canal is low, and follows a river and the lake for most of the way across, so that engineers say a canal could easily be built. This canal, however, would have been one hundred and seventy miles long, or more than three times the length of the Panama Canal.

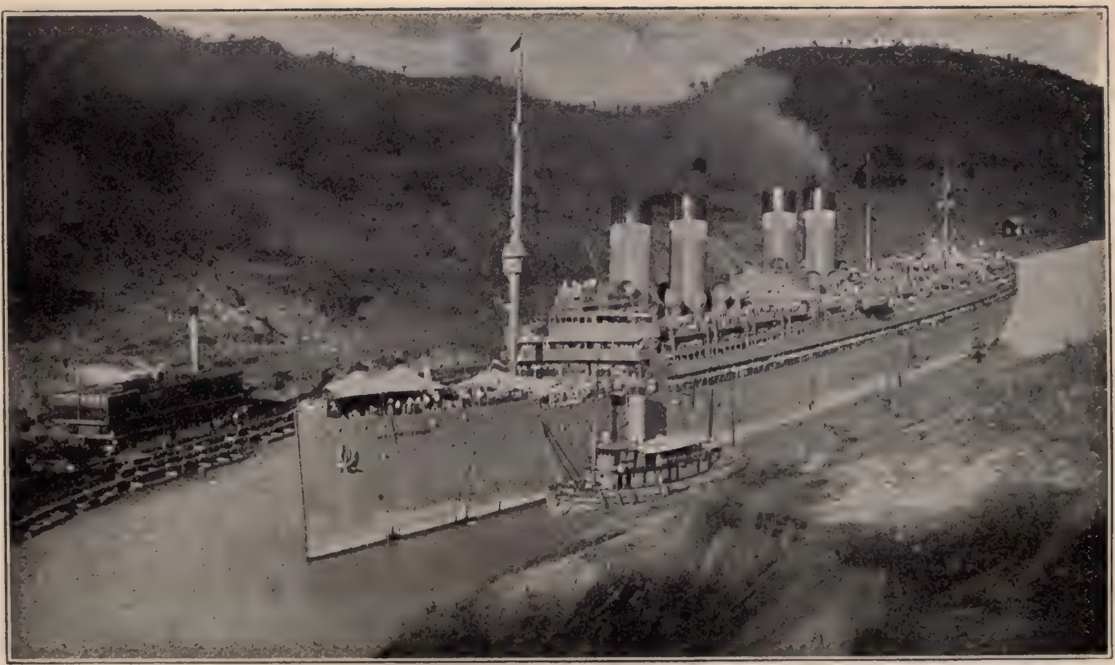
From Managua we go northward by rail and then steamer to the Gulf of Fonseca (fōn-sā′kä), and there get mules which take us to Tegucigalpa (tâ-gōō-sē-gäl′pä), the capital of Honduras. This city is far in the interior, but it is high and healthful and the people claim it is one of the best places in all North America.

Coming back, we make a short stay at San Salvador, the capital of the state of Salvador. Here is another fine town with many buildings, built low on account of the earthquakes by which the city has been almost destroyed several times in the past. Indeed all the Central American capitals are much the same. They are Spanish towns like those we saw during our stay in Mexico.

The trip from Salvador to Panama by steamer requires several days. We move slowly south along the dry, thirsty coast of the Pacific, comparing it with the wet tropical lowlands and dense vegetation along the Caribbean Sea. Now and then we pass a steamer from the Panama Canal going northward to San Francisco or Seattle, and finally we enter the great Gulf of Panama and come to anchor in the port of Balboa, at the Pacific end of the canal.

We are now again under the flag of the United States. Old Glory floats above the public buildings and warehouses, and we can see it flying also over the great hospital and hotels on Ancon Hill. A little farther to the east is the city of Panama, the capital of the Panama republic, and right in front is the entrance to the Panama Canal, through which our steamer is to climb over one of the low passes of the highland to the Caribbean Sea.

We spend one day in visiting the capital of Panama. It is a beautifully situated city looking out on the gulf, with some of the old walls which were built to keep off the buccaneers and pirates still standing. The city has a large cathedral, a university, and some fine public buildings. The streets are well paved. It has street cars and electric lights and all modern improvements. The president of the republic tells us that his country has benefited greatly by the building of the canal, and that he hopes that our two peoples will always be friends.



Steamer in the Panama Canal, at the Gaillard Cut.

LXXIV. THE PANAMA CANAL — HOME TO NEW YORK

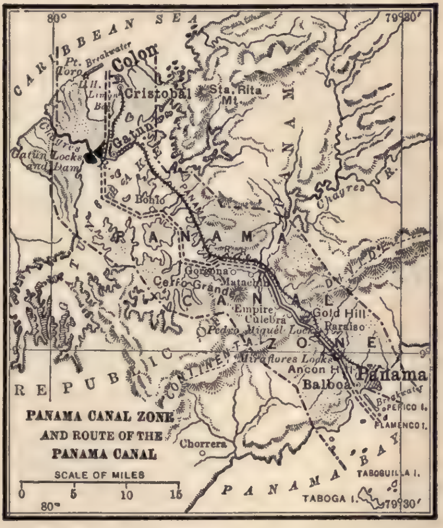
WE begin this morning our last journey in Central America. We shall cross the North American continent where it is narrowest, by the Panama Canal, and then steam on to New York. We have now traveled through all the countries of the North American continent from Alaska to the Isthmus of Panama. We have gone from the Atlantic Ocean to the Pacific in Canada, in the United States, in Mexico, and in the northern part of Central America. In some of these journeys the distance has been more than three thousand miles. The trip upon which we are starting to-day will be only about fifty miles—so short that an airplane could make it in a half hour or less. The time will be less than a day, but if it were not for the canal, and if we still wished to go all of the way by sea, it would take us more than a month to reach the other side of the continent. We should have to travel thousands of miles southward along western South America to the Strait of Magellan, steam through that strait a distance of two hundred miles into the Atlantic Ocean, and going northward should still have six or seven thousand miles more to travel before we could reach the port on the other side of the Isthmus. The difference in time would be more than one month, and the expense, notwithstanding heavy tolls charged by the canal, would be very much greater.

The Isthmus of Panama is the narrow neck of land connecting North America and South America. It consists of a range of low mountains, the highest of which at this point are not so high as the tallest office buildings of our larger cities. The Isthmus is so narrow that we could cross it by automobile in two or three hours, or upon foot in two days. Nevertheless, until August, 1914, this little strip of land acted as a mighty wall between the Atlantic and Pacific oceans, blocking the commerce of the world. Ships could come from either of the two oceans to the wall, but they had to travel thousands of miles out of their course to go from one side to the other. It took them many weeks to go by way of the Strait of Magellan or Cape Horn; and parts of Asia, Australia, South America, and Europe, so far as the sea routes between them were concerned, were thousands of miles farther apart than they are now.

From time to time men planned to dig a waterway through the Isthmus, to make a short cut from ocean to ocean. The work was so great, however, that it was not until 1879 that any one dared to attempt it. At that time a French company, with plans made by Ferdinand de Lesseps′, began the work. De Lesseps had already dug the canal through the Isthmus of Suez, which joined Africa and Asia, and he was thought to be just the man to cut through the Isthmus of Panama.

But the French found that digging a ditch through a level desert of sand like that of the Isthmus of Suez was far different from cutting a canal through the Isthmus of Panama. In Panama a mountain had to be blasted down, vast amounts of earth and rock had to be moved out of the way, and mighty dams had to be built to control the floods. The French company began the work extravagantly, and had spent several hundred million dollars before the French people became dissatisfied and would give no more money. After it failed, a new French company sold its right to build the canal, including all the work that had been done, to our government for the sum of forty million dollars.

When Colombia declined to make a treaty confirming our right to build the canal, the province of Panama declared its independence. Then by treaty with Panama we acquired a strip of territory ten miles wide running from one side of the Isthmus to the other. This is called the Canal Zone, and through the middle of it we dug our great waterway. We used a little of the work done by the French, but had to do many times as much more and so changed the character of the canal that it is an American work throughout.


PANAMA CANAL ZONE AND ROUTE OF THE PANAMA CANAL

The plans of Ferdinand de Lesseps proposed a sea-level canal, like that at Suez. He tried to cut down the pass through the mountains to the level of the sea so that the two oceans could run together and vessels could steam right through from one to the other. These plans were found impossible by our engineers, and our canal is a lock canal, only about one third of it being on the level of the sea, and about two thirds, or over thirty miles, on a plane which is eighty-five feet above that level. At either end of the elevated portion are great locks by means of which the ships are raised or lowered from one part of the canal to the other. Thus they sail as over a great water bridge from ocean to ocean. The locks are somewhat like those we saw in the Great Lakes. They might be called the steps on each side of the bridge.

The elevated part of the canal has been made by cutting down and blasting out the earth and rock of the Gaillard Cut through the mountains, and also by damming the Chagres (chä′grĕs) River so that a lake has been formed at the level of 85 feet above the sea. The dam is known as the Gatun (gä-tōōn′) Dam and the lake is Lake Gatun. It is the waters of Lake Gatun that flow through the pass, and fill the locks that raise and lower the ships.

The locks are much more wonderful than those of the Great Lakes. Each lock is one thousand feet long and big enough to hold the largest ship afloat. The gates to the locks are of steel, and they comprise millions of pieces so closely fitted together that they keep out the water. They are moved by machinery, whose motive power is electricity generated by the fall of the surplus waters of Gatun Lake at the dam.

The story of building the canal is so wonderful that it would take a large book to describe it. Its cost all together was about three hundred and seventy-five millions of dollars, and millions more were spent by the United States in building fortifications and in the purchase of rights, so that the sums appropriated for the canal by Congress have been almost a half billion dollars. In this is included twenty-five million dollars given to Colombia in 1921 to settle the claim of that country as former owner of the Isthmus.

To-day the canal is well fortified along the line of the route, and also by the great military works on the islands near the entrances from the Atlantic and the Pacific. Our government has a railroad running through the Canal Zone from one side of the Isthmus to the other, and we keep a large force of Americans in the Canal Zone to run this road, to operate the machinery of the canal, and to manage the docks, warehouses, coaling stations, and other establishments at each end. We have great warehouses, ice plants, cold storage plants, hospitals, and hotels in the Canal Zone. We have water works and fuel oil tanks, and stores which contain everything needed by the ships that pass through. The people of the Canal Zone are under the rule of a governor appointed by the President. The civil population is not large, and the zone is kept as a military reservation upon which no private individuals or traders are permitted to settle or acquire land.

The first great steamer to go through the canal was the *Ancon*, belonging to the United States government. It passed from one ocean to the other on August 15, 1914, carrying the Secretary of War and two hundred other passengers. The time taken was nine hours. Now the average time of passage is seven or eight hours, and the shortest passage has been four hours and ten minutes. It is estimated that thirty-six ships can pass through in one day, and within five years after the canal was opened over ten thousand vessels had passed through.

Among the great difficulties in the construction of the canal were the fevers and other tropical diseases, which were so common when the Panama railroad was first built that it was said a man died for every tie laid in the track. Many thousands died while the French were at work, but during our building of the canal the death rate became lower than that of many large cities. This was due largely to Surgeon-General W. C. Gorgas, whose sanitation methods made the Canal Zone one of the most healthful parts of the world. The building of the canal during the greater part of its construction was under General George W. Goethals (gō′thalz), a famous engineer of the United States Army.

In our trip through the canal we leave Balboa in the morning and steam slowly up the wide channel which leads from the Pacific to the locks of Miraflores (mē-rä-flō′rās). Now we are inside the locks. The gates behind us have closed, and we can feel ourselves rising. The great steamer is soon floating on the level of a second lock, in which we are lifted to Lake Miraflores. Our ship is towed through the locks by electric locomotives which run along the walls on each side. We put on steam as we pass through

Steamer in one of the locks in the Panama Canal.

the lake, and then enter the lock of Pedro Miguel (pā′drō mė-gĕl′), where the locomotives move us on to the Gaillard Cut.

In the first two locks we have risen 55 feet, and in the third, 30 feet. In all we have been lifted 85 feet above the level of the two oceans, and we are now at just about the same height above that level as a roof of an eight-story building is above the ground. It is on this level that we steam on through the Gaillard Cut and enter Lake Gatun. The cut is nine miles in length, and the lake is twenty-four miles long. Winding our way across it, we come to the Gatun Dam, an immense structure which was erected between two mountains to hold back the waters of the Chagres River, which form the lake. We pass through the dam by a series of these locks, dropping from one to another as the waters are let out, and finally steaming out into a channel which leads to Limon Bay and the Atlantic Ocean. In our ride through the Canal we have gone all together a little more than forty miles, the distance from deep water in the Pacific Ocean to deep water in the Atlantic Ocean being just about fifty miles.

As we look back over our trip we can easily understand what is meant by the saying that the Panama Canal is a fresh-water bridge connecting the salt waters of the Pacific and of the Atlantic. We tasted the water when we started from Balboa. It was salt and bitter. We drew up a bucket over the side of the steamer while we were in the locks of Miraflores. The water there was as fresh as our drinking water at home. It came from the mountains, and the same kind of water filled all the locks and Lake Gatun. It was this fresh water that raised us to the level of Gaillard Cut and kept the steamer afloat until we dropped down through the Gatun locks into the salt waters of the Atlantic.

The channel from Gatun locks to the Atlantic is only seven miles long. It takes us but a short time to steam through it to Cristobal (krĭs-tō-bäl′), which is our port at the Atlantic end of the Canal. We wait there but a few hours, and then the steamer starts out for New York. We cross Limon Bay and are soon in the wide Caribbean Sea. The weather now is delightful. The sun shines, and we get splendid snapshots of flying fish as they dart from wave to wave in front of our steamer. A day after leaving the canal we see the blue mountains of Jamaica on our right, and a little later we are steaming between Haiti and Cuba, going very close to Santiago, where our naval battle with the Spaniards was fought.

The next islands we see are the Bahamas, on one of which Columbus first landed when he found the New World. After that we have only the ocean in view until we near the Atlantic coast of the United States at Sandy Hook. It is there that we stop for our pilot, who conducts the steamer through the channel in the entrance to New York harbor, taking us by Staten Island and the great Statue of Liberty to the wharves of New York.

1. Where is the Isthmus of Tehuantepec? Compare its width with that of Panama along the line of the canal.
2. What is the Intercontinental Railway?
3. Where is Central America? What body of water lies on the east? On the west? What country on the north? On the south?
4. Compare Central America in size with four states of the United States. In surface with Mexico. Of how many countries does it consist? Compare each in size with one of our states.
5. What are the chief products of Central America? Mineral? Agricultural?
6. What Central American fruit product is most important to us? Where does it grow? Describe a visit to one of the plantations and tell how the fruit is grown and shipped to the United States.
7. Visit a mahogany forest and compare the lumbering there with

that about Lake Superior. How is rubber obtained in Central America? In Brazil? (See Carpenter's "South America," pages 344-351, also Carpenter's "How the World is Clothed, pages 240-261).

8. What are the capitals of Central America? Where is each located? Describe the buildings and tell why they are of only one or two stories.

9. Through what Central American country other than Panama was it planned to build a canal? What was the length of the proposed canal? Where was it planned to build a ship railway?

10. At what port of the Pacific do we arrive in coming to Panama? After whom was it named? Tell all you can about him. (See Carpenter's "South America," page 27.) What great discovery did he make?

11. How long is the Panama Canal? Why is it called a water bridge? What did it cost? Compare the Panama Canal with the Sault Ste. Mary's Canal. With the Suez Canal. (See Carpenter's "Africa.")

12. Take five trips from New York through the canal to an important port of another continent, and show the saving by way of the canal. Describe your trip in each case.

13. Describe your journey through the canal. What important cities are at each end of it?

TABLES

TABLE I. AREA OF CONTINENTS AND OCEANS

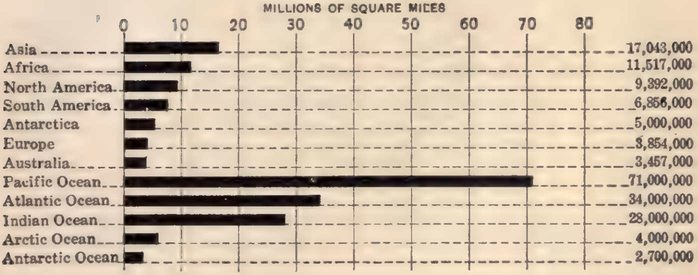


TABLE II. AREA OF NORTH AMERICAN COUNTRIES

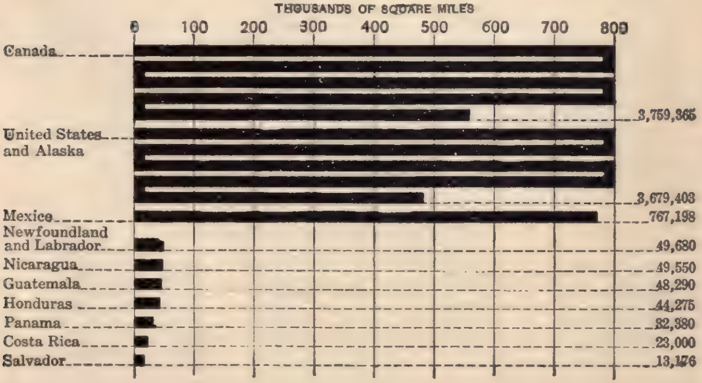


TABLE III. POPULATION OF NORTH AMERICAN COUNTRIES

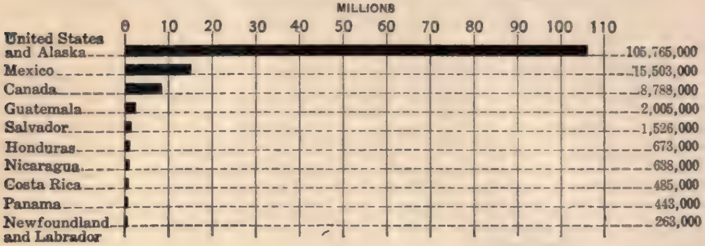


TABLE IV. AREA AND POPULATION OF THE STATES OF THE UNITED STATES

	AREA (SQ. MI.)	POPULATION (1920)
Northeastern States		
Maine	33,040	768,014
Vermont	9,564	352,428
New Hampshire	9,341	443,083
Massachusetts	8,266	3,852,356
Connecticut	4,965	1,380,631
Rhode Island	1,248	604,397
Middle Atlantic States		
New York	49,204	10,385,227
Pennsylvania	45,126	8,720,017
New Jersey	8,224	3,155,900
South Atlantic States		
Georgia	59,265	2,895,832
Florida	58,666	968,470
North Carolina	52,426	2,559,123
Virginia	42,627	2,309,187
South Carolina	30,989	1,683,724
West Virginia	24,170	1,463,701
Maryland	12,327	1,449,661
Delaware	2,370	223,003
District of Columbia	70	437,571
South Central States		
Texas	265,896	4,663,228
Oklahoma	70,057	2,028,283
Arkansas	53,335	1,752,204
Alabama	51,998	2,348,174
Louisiana	48,506	1,798,509
Mississippi	46,865	1,790,618
Tennessee	42,022	2,337,885
Kentucky	40,598	2,416,630

TABLE IV (*Continued*)

	AREA (SQ. MI.)	POPULATION (1920)
North Central States		
Minnesota	84,682	2,387,125
Kansas	82,158	1,769,257
South Dakota	77,615	636,547
Nebraska	77,520	1,296,372
North Dakota	70,837	646,872
Missouri	69,420	3,404,055
Michigan	57,980	3,668,412
Illinois	56,665	6,485,280
Iowa	56,147	2,404,021
Wisconsin	56,066	2,632,067
Ohio	41,040	5,759,394
Indiana	36,354	2,930,390
Plateau States		
Montana	146,997	548,889
New Mexico	122,634	360,350
Arizona	113,956	334,162
Nevada	110,690	77,407
Colorado	103,948	939,629
Wyoming	97,914	194,402
Utah	84,990	449,396
Idaho	83,888	431,866
Pacific States		
California	158,297	3,426,861
Oregon	96,699	783,389
Washington	69,127	1,356,621
Alaska	590,884	54,899

TABLE V. AREA AND POPULATION OF THE PROVINCES OF CANADA

PROVINCE	AREA (SQ. MI.)	POP. (1920)
Northwest Territories	1,272,000	7,988
Quebec	706,834	2,361,199
Ontario	407,262	2,933,662
British Columbia	355,855	524,582
Alberta	255,285	588,454
Manitoba	251,832	610,118
Saskatchewan	251,700	757,510
Yukon Territory	207,000	4,157
New Brunswick	27,985	387,876
Nova Scotia	21,428	523,837
Prince Edward Island	2,184	88,615

TABLE VI. POPULATION OF LARGE CITIES OF NORTH AMERICA

THE UNITED STATES

Akron, Ohio	208,435
Albany, N. Y.	113,344
Atlanta, Ga.	200,616
Baltimore, Md.	733,826
Birmingham, Ala.	178,806
Boston, Mass.	748,060
Bridgeport, Conn.	143,555
Buffalo, N. Y.	506,775
Cambridge, Mass.	109,694
Camden, N. J.	116,309
Chicago, Ill.	2,701,705
Cincinnati, Ohio	401,247
Cleveland, Ohio	796,841
Columbus, Ohio	237,031
Dallas, Texas	158,976
Dayton, Ohio	152,559
Denver, Colo.	256,491
Des Moines, Iowa	126,468
Detroit, Mich.	993,678
Duluth, Minn.	98,917
Elizabeth, N. J.	95,783
Erie, Pa.	93,372
Fall River, Mass.	120,485
Flint, Mich.	91,599
Fort Worth, Tex.	106,482
Grand Rapids, Mich.	137,634
Hartford, Conn.	138,036
Houston, Tex.	138,276
Indianapolis, Ind.	314,194
Jacksonville, Fla.	91,558
Jersey City, N. J.	298,103
Kansas City, Kans.	101,177
Kansas City, Mo.	324,410
Lawrence, Mass.	94,270
Los Angeles, Calif.	576,673
Louisville, Ky.	234,891
Lowell, Mass.	112,759
Lynn, Mass.	99,148
Memphis, Tenn.	162,351
Milwaukee, Wis.	457,147
Minneapolis, Minn.	380,582
Nashville, Tenn.	118,342
Newark, N. J.	414,524
New Bedford, Mass.	121,217
New Haven, Conn.	162,537
New Orleans, La.	387,219
New York, N. Y.	5,620,048
Norfolk, Va.	115,777
Oakland, Calif.	216,261
Oklahoma City, Okla.	91,295
Omaha, Nebr.	191,601
Paterson, N. J.	135,875
Philadelphia, Pa.	1,823,779
Pittsburgh, Pa.	588,343
Portland, Oregon	258,288
Providence, R. I.	237,595
Reading, Pa.	107,784
Richmond, Va.	171,667
Rochester, N. Y.	295,750
St. Louis, Mo.	772,897
St. Paul, Minn.	234,698
Salt Lake City, Utah	118,110
San Antonio, Tex.	161,379
San Francisco, Calif.	506,676
Scranton, Pa.	137,783
Seattle, Wash.	315,312
Somerville, Mass.	93,091
Spokane, Wash.	104,437
Springfield, Mass.	129,614
Syracuse, N. Y.	171,717
Tacoma, Wash.	96,965
Toledo, Ohio	243,164
Trenton, N. J.	119,289
Utica, N. Y.	94,156
Washington, D. C.	437,571
Wilmington, Del.	110,168
Worcester, Mass.	179,754
Yonkers, N. Y.	100,176
Youngstown, Ohio	132,358

OTHER COUNTRIES

Montreal, Canada	618,506
Toronto, Canada	521,893
Winnipeg, Canada	179,089
Vancouver, Canada	117,217
Ottawa, Canada	107,843
Mexico, Mexico	1,080,000
Guadalajara, Mexico	119,468
Puebla, Mexico	96,121
Guatemala, Guatemala	90,000
San Salvador, Salvador	80,000
Panama, Panama	62,000

TABLE VII. HIGH MOUNTAINS

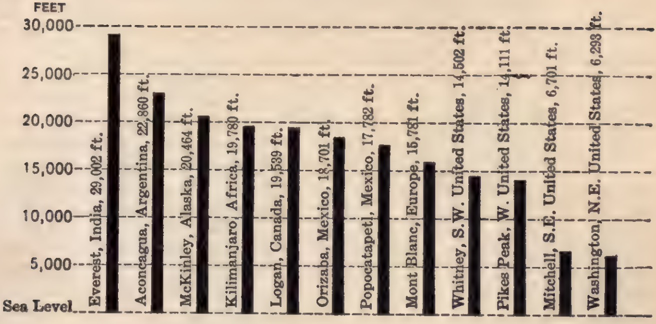


TABLE VIII. IMPORTANT RIVERS

	LENGTH, MILES		LENGTH, MILES
NORTH AMERICA			
Athabasca	765	Yellowstone	1,100
Colorado	1,400	Yukon	2,000
Columbia	1,400	Kuskokwim	700
Delaware	375		
Hudson	350	OTHER CONTINENTS	
James	450	Amazon	3,500
Mackenzie	2,400	Danube	1,700
Missouri-Mississippi	4,200	Ganges	1,500
Ohio	950	Hwang	2,800
Platte	1,260	Kongo	2,800
Peace	1,065	Nile	3,900
Potomac	450	Orinoco	1,500
Red	1,200	Plata-Parana	2,500
Rio Grande	1,800	Volga	2,300
St. Lawrence	2,150	Yangtze	3,100
Saskatchewan	1,205	Zambezi	2,200

TABLE IX. WATER POWERS OF THE WORLD

	AVAILABLE H. P.	DEVELOPED H. P.
United States	55,000,000	4,100,000
Canada	18,000,000	1,300,000
Norway	7,500,000	920,000
Sweden	6,750,000	550,000
France	5,857,000	650,000
Italy	5,500,000	565,000
Spain	5,000,000	300,000
Finland	3,000,000	....
Switzerland	1,500,000	380,000
Germany	1,425,000	445,000
Great Britain	963,000	80,000

TABLE X. SAILING DISTANCES FROM NEW YORK, NEW ORLEANS, SAN FRANCISCO, TO PRINCIPAL PORTS AND CITIES OF THE WORLD

PORT	ROUTE	N. Y.	N. ORL.	SAN FRAN.
Aden	Suez Canal	6,532	7,870	....
	Suez and Panama	....	....	10,800
	Singapore	....	....	11,500
Antwerp	(Direct)	3,325	4,853	....
	Panama	....	....	8,264
Bombay	Suez Canal	8,120	9,536	....
	Suez and Panama	....	....	12,512
	Singapore	....	....	9,780
	Singapore and Panama	14,837	14,236	....
Buenos Aires	(Direct)	5,868	6,318	....
	Magellan Strait	....	....	7,511
Calcutta	Suez Canal	9,830	11,239	....
	Singapore	....	....	8,990
	Singapore and Panama	14,230	13,694	....
Cape Town	(Direct)	6,815	7,374	....
	Panama	....	....	9,898
Colon (eastern end of	(Direct)	1,981	1,380	....
Panama Canal)	Canal and Panama	....	....	3,324
Copenhagen	(Direct)	3,852	5,443	....
Gibraltar	(Direct)	3,207	4,576	....
	Panama	....	....	7,642
Hamburg	(Direct)	3,652	5,243	....
	New York	....	....	6,843
Havre	(Direct)	3,169	4,760	....
	New York	....	....	6,360

TABLE X. SAILING DISTANCES, ETC.—*Continued*

PORT	ROUTE	N. Y.	N. ORL.	SAN FRAN.
Hongkong	(Direct)	....	....	6,086
	Panama	11,431	10,830	....
	Suez	11,610	12,892	....
Liverpool	(Direct)	3,053	4,553	....
	Panama	....	....	8,038
London	(Direct)	3,233	4,507	....
	Panama	....	....	8,218
Manila	(Direct)	....	....	6,943
	Yokohama	....	....	6,289
	Panama	11,546	10,993	....
	Suez	11,556	12,946	....
Marseille	(Direct)	3,876	5,266	....
	Panama	....	....	8,332
Melbourne	(Direct)	....	....	7,040
	Panama	10,028	9,427	....
	Suez Canal	12,981	14,303	....
New Orleans	(Direct)	1,738	....	....
	Panama	....	....	4,687
New York	(Direct)	....	1,738	....
	Panama	....	....	5,262
Petrograd	(Direct)	4,632	6,223	....
	New York	....	....	7,823
Port Said, Egypt	(Direct)	5,122	6,509	....
	Panama	....	....	9,562
Rio de Janeiro	(Direct)	4,778	5,218	....
	Panama	....	....	7,678
San Francisco	Panama	5,262	4,687	....
Shanghai	(Direct)	....	....	5,550
	Panama	10,855	10,254	....
	Suez	12,360	13,750	....
Singapore	(Direct)	....	....	7,502
	Suez	10,170	11,560	....
	Yokohama and Panama	13,104	12,503	....
Sitka, Alaska	(Direct)	....	....	1,302
	Panama	6,607	6,006	....
Valparaiso	(Direct)	....	....	5,140
	Panama	4,637	4,035	....
Vladivostok	(Direct)	....	....	4,706
	San Francisco & Panama	10,001	9,410	....
Wellington, New Zealand	(Direct)	....	....	5,909
	Panama	8,540	7,939	....
	Suez	14,230	15,620	....
Yokohama	(Direct)	....	....	4,536
	Honolulu and Panama	10,093	9,492	....

Table XI. Distances by Rail Between Cities of the United States

From To:	New York	New Orleans	San Francisco
Atlanta, Ga.	876	496	2,810
Baltimore, Md.	188	1,184	3,081
Boston, Mass.	235	1,607	3,313
Buffalo, N. Y.	442	1,275	2,804
Charleston, S. C.	739	776	3,119
Chattanooga, Tenn.	847	491	2,672
Chicago, Ill.	912	912	2,279
Cincinnati, Ohio	757	829	2,377
Cleveland, Ohio	584	1,092	2,636
Columbus, Ohio	637	945	2,593
Dallas, Tex.	1,769	515	1,932
Denver, Col.	1,930	1,357	1,376
Des Moines, Iowa	1,270	1,044	1,931
Detroit, Mich.	693	1,100	2,551
Duluth, Minn.	1,391	1,391	2,243
El Paso, Tex.	2,310	1,195	1,287
Galveston, Tex.	1,782	410	2,157
Helena, Mont.	2,452	2,152	1,255
Indianapolis, Ind.	825	888	2,462
Jacksonville, Fla.	983	616	3,098
Kansas City, Mo.	1,342	880	1,986
Key West, Fla.	1,454	1,087	3,569
Little Rock, Ark.	1,290	487	2,291
Los Angeles, Calif.	3,149	2,007	475
Louisville, Ky.	871	778	2,473
Memphis, Tenn.	1,157	396	2,439
Milwaukee, Wis.	997	997	2,364
Minneapolis, Minn.	1,332	1,285	2,101
Mobile, Ala.	1,231	141	2,623
New Orleans, La.	1,372	....	2,482
New York, N. Y.	....	1,372	3,191
Norfolk, Va.	347	1,093	3,247
Oklahoma, Okla.	1,608	752	1,994
Omaha, Nebr.	1,405	1,080	1,786
Philadelphia, Pa.	91	1,281	3,100
Pittsburgh, Pa.	444	1,142	2,747
Portland, Maine	350	1,722	3,428
Portland, Oregon	3,204	2,746	722
St. Paul, Minn.	1,322	1,275	2,091
St. Louis, Mo.	1,065	699	2,199
Salt Lake City, Utah	2,442	1,928	823
San Antonio, Tex.	1,943	571	1,911
San Diego, Calif.	3,231	2,088	602
San Francisco, Calif.	3,191	2,482	....
Sante Fé, N. Mex.	2,211	1,351	1,286
Sault Ste. Marie, Mich.	1,036	1,399	2,581
Savannah, Ga.	845	661	3,104
Seattle, Wash.	3,151	2,931	957
Sioux City, Iowa	1,422	1,173	1,821
Tacoma, Wash.	3,199	2,890	916
Toledo, Ohio	705	1,040	2,523
Washington, D. C.	228	1,144	3,069

TABLE XII. PRINCIPAL COUNTRIES PRODUCING GOLD

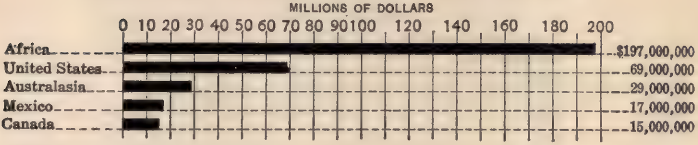


TABLE XIII. PRINCIPAL COUNTRIES PRODUCING SILVER

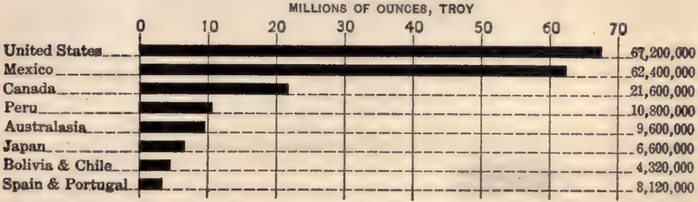


TABLE XIV. PRINCIPAL COUNTRIES PRODUCING IRON

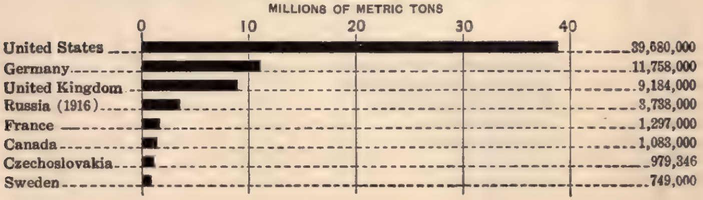


TABLE XV. PRINCIPAL COUNTRIES PRODUCING COAL

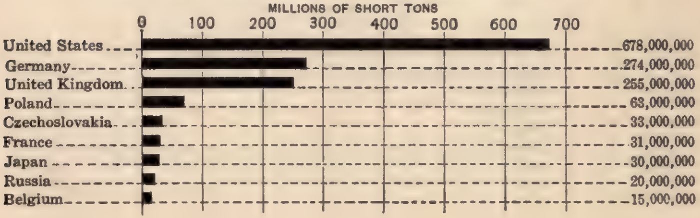


TABLE XVI. PRINCIPAL COUNTRIES PRODUCING COPPER

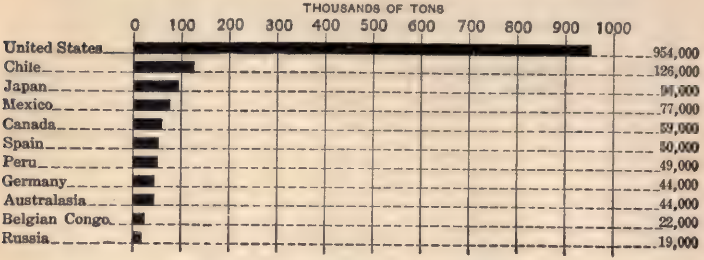


TABLE XVII. PRINCIPAL COUNTRIES PRODUCING PETROLEUM

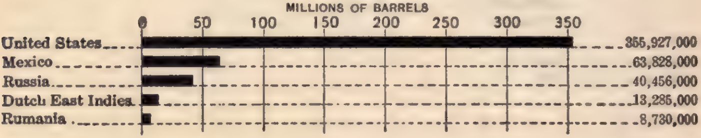


TABLE XVIII. PRINCIPAL COUNTRIES RAISING SHEEP

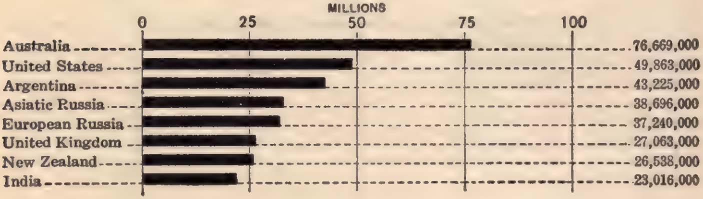


TABLE XIX. PRINCIPAL COUNTRIES RAISING CATTLE

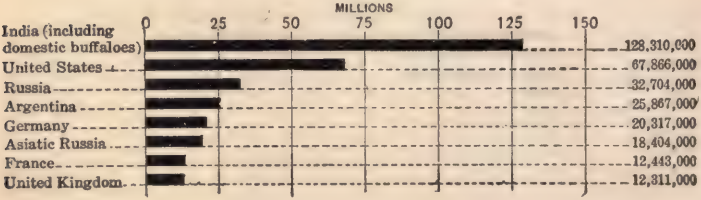


TABLE XX. PRINCIPAL COUNTRIES PRODUCING WHEAT

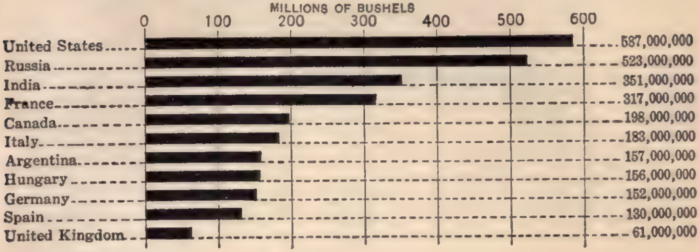
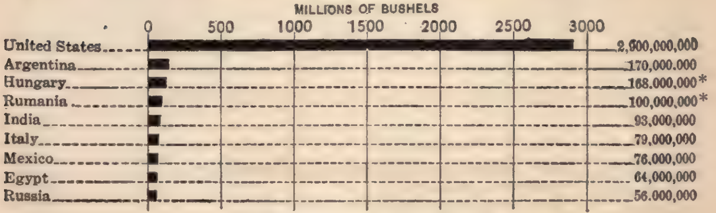


TABLE XXI. PRINCIPAL COUNTRIES PRODUCING CORN



*Production before the World War

TABLE XXII. PRINCIPAL COUNTRIES PRODUCING RICE

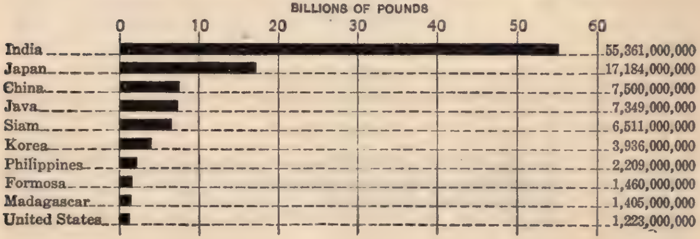


Table XXIII. Principal Countries Producing Beet Sugar

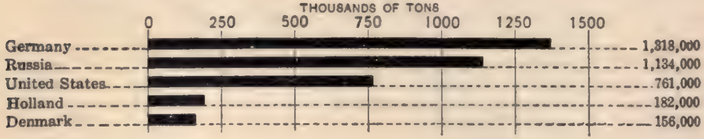


Table XXIV. Principal Countries Producing Cane Sugar

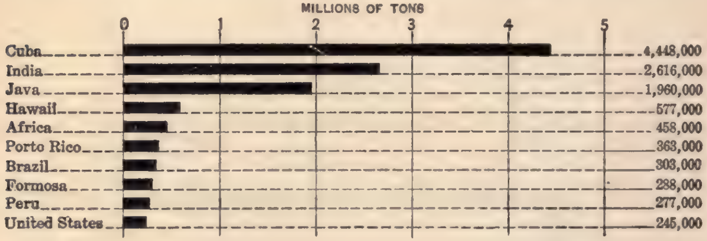


Table XXV. Principal Countries Producing Cotton

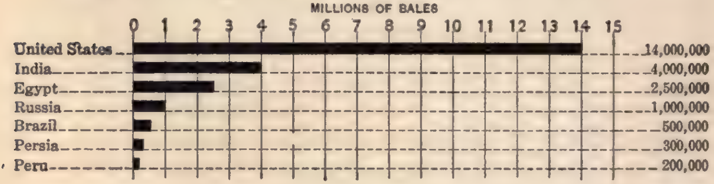
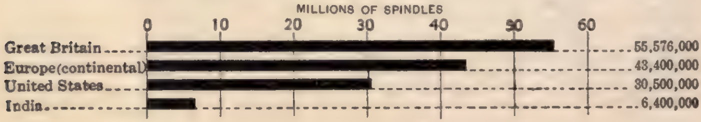


Table XXVI. Principal Countries Manufacturing Cotton



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MARKINGS: ā in lāte, ả in senảte, ă in făt, â in câre, ä in fär, ȧ in lȧst; ē in mē, ė in rėturn, ĕ in mĕt, ẽ in tẽrm; ī in fīne, ĭ in tĭn; ɴ = ng in its effect (nasal) on the preceding vowel, but is not itself sounded; ō in nōte, ȯ in ȯbey, ŏ in nŏt, ô in fôr, o͞o in scho͞ol, o͝o in wo͝ol; t̶h̶ in t̶h̶ine; ū in tūne, ŭ in nŭt, û in bûrn.

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